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ABSTRACT

The Washington grade 4-6 mathematics curriculum is organized according to the Small Schools Materials format which lists the sequence of learning objectives related to a specific curriculum area, recommends a teaching and mastery grade placement, and identifies activities, monitoring procedures and possible resources used in teaching to the objectives. The objectives are correlated to the Goals for Washington Common Schools and to broad K-12 mathematics program goals. The grade 4-6 mathematics scope areas are defined as: whole numbers (equality and inequality, reading and writing numerals, place value, addition, subtraction, multiplication, division, story problems); rational numbers (common fractions, ratios, percentage, proportion, decimals); numeration (number theory, scientific notation, exponents); geometry (two- and three-dimensional shapes, points, lines, line segments, angles, triangles, circles, perimeter, area); graphs; probability and statistics; and measurements (time, money, linear, metric, capacity, weight, temperature, and maintenance of English measurement). (NEC)

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SMALL SCHOOLS

MATHEMATICS CURRICULUM

GRADES 4-6

Reading · Language Arts · Mathematics · Science · Social Studies

RC012849

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Olympia, Washington

SMALL SCHOOLS

MATHEMATICS CURRICULUM

4-6

Scope

Objectives

Activities

Resources

Monitoring Procedures

Working Copy
December 1977

This is a publication of the Instructional Programs Division of the Superintendent of Public Instruction, Olympia, Washington.

Dr. Frank B. Brouillet
State Superintendent of Public Instruction

Dr. Jack Frisk
Deputy Superintendent

Dr. Donald Hair
Assistant Superintendent
Instructional Programs Division

William Radcliffe, Jr.
Director
Basic Education Section

Therese Destito
Supervisor
Small Schools Curriculum Project

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Small Schools Planning Committee:
JoAnne Nelson, Coordinator, Small Schools Project, ESD 189
Dr. David Hartl, Assistant Superintendent, C&I, ESD 189
Robert Gilden, Administrative Assistant, Lake Stevens School District
Eugene Elledge, Assistant Superintendent, Monroe School District
Don Van Liew, Elementary Principal, Granite Falls School District
Robert Estes, Curriculum Director, Lake Stevens School District
Dr. Ronald Crawford, Assistant Superintendent, Snohomish School District
Richard Reim, Elementary Principal, Stanwood School District
Tom Sofie, Elementary Principal, Sultan School District
Dr. Donald Hair, Assistant Superintendent, SPI
Therese Destito, Supervisor, Small Schools Project, SPI

Mathematics Committee:
Bob Alexander, Teacher, South Whidbey School District
Rich Bemis, Teacher, Stanwood School District
Greg Coffin, Teacher, Monroe School District
Roy Dotson, Teacher, Lake Stevens School District
Jan Downen, Teacher, Darrington School District
Mary Ann Ford, Vice-Principal, Arlington School District
Joanne Frazier, Teacher, Snohomish School District
Ron Gann, Teacher, Lakewood School District
Ken Haakenstad, Teacher, Lake Stevens School District
John Hager, Vice-Principal, Sultan School District
Nancy Harden, Teacher, Lakewood School District
Gary Haslett, Vice-Principal, Sultan School District
Marvin Hendrickson, Elementary Principal, Arlington School District
James Hougardy, Principal, Lake Stevens School District
Dave King, Teacher, Monroe School District
Gaylord Luginsland, Elementary Principal, South Whidbey School District
Mike Lynch, Teacher, Sultan School District
Larry S. Martinec, Teacher, Granite Falls School District
James Morse, Principal, Monroe School District
Mert Nordby, Teacher, Stanwood School District
Bob Powell, Teacher, Granite Falls School District
Lois Pruiett, Teacher, Arlington School District
Hal Ring, Elementary Principal, Darrington School District
Richard Schalo, Teacher, Sultan School District
Bob Smith, Teacher, Snohomish School District
Tom Sofie, Elementary Principal, Sultan School District
Dave Swartos, Teacher, Arlington School District
Gary Timmerman, Principal, Lakewood School District
Bill Van Brocklin, Principal, Stanwood School District
Don Van Liew, Elementary Principal, Granite Falls School District
Rod Vroman, Principal, Snohomish School District

Many educators have been involved in the development of the Small Schools Curriculum materials. Of these, Robert Groeschell, now retired from the office of the State Superintendent of Public Instruction, deserves special recognition of his insight, leadership and support in initiating the Small Schools Curriculum Project.

In order to provide assistance to small school districts, a curriculum assessment was conducted by Mr. Groeschell in the spring of 1975. The findings of this assessment pointed out the need for the development of curriculum guidelines to assist small districts in identifying learning objectives and in planning for program implementation. These findings were used to provide the basis for originally funding the Small Schools Curriculum Project.

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Special Consultants:
John Kenny, Elementary Mathematics Specialist, Seattle School District
Robert Lepse, Mathematics Consultant, Northshore School District
Reg Waddoups, Mathematics Department Head, Seattle School District

Resource Personnel
Terry Beatty, Graphics Artist, ESD 189
Meri Smith, Cover Design, SPI

Office Services:
Phyllis Wilson, SPI
Evelyn Sigler, ESD 189
Nancy French, ESD 189

Dr. David Hartl, Editor, ESD 189
JoAnne Nelson, Editor, ESD 189
Therese Destito, Editor, SPI

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INTRODUCTION

The Small Schools materials were developed through the cooperative efforts of three levels of educational organizations: local, regional and state. Forty primary teachers and ten elementary principals from small districts in Snohomish and Island Counties (Arlington, Darrington, Granite Falls, Lake Stevens, Lakewood, Monroe, Snohomish, Stanwood, Sultan, South Whidbey and Monroe Christian School), developed and sequenced student learning objectives for grades kindergarten through third in five curriculum areas: reading, language arts, mathematics, science and social studies. Suggested activities, monitoring procedures and possible resources used in teaching the objectives were identified and each student learning objective was correlated to the State Goals for Washington Common Schools and to broad program goals.

On the following pages you will find the Small Schools Mathematics Curriculum materials for grades seven through eight. Included are student learning objectives, suggested activities, suggested monitoring procedures and possible resources. These materials were developed during 1975-76, and were piloted during the 1976-77 school year in more than twenty small districts within the state. Pilot districts included the districts which originally developed the materials, as well as Methow Valley, Chelan, Entitat, Orondo, Leavenworth, Peshastin-Dryden, Washtucna, Wahluke, Royal City, Wilson Creek, Othello and Quincy. Personnel from ESDs 189 and 171 assisted with the implementation of the pilot materials by providing regional organization, coordination, technical assistance and secretarial services. Data collected from the pilot districts were used to modify the materials in preparation for publication and statewide distribution.

Original funding for the project was made available through a Title IV, Part C, grant awarded to the Lake Stevens School District. Technical assistance in the development of the winning proposal was provided by ESD 189 and SPI. Since November 1975, funds for the project have been made available through the budget of the Superintendent of Public Instruction, Division of Instructional Programs, ESD 189 and the office of the Superintendent of Public Instruction have worked cooperatively to provide participating districts with curriculum assistance, organization leadership, editorial services and the publication of materials. Curriculum specialists from Washington colleges, universities and local school districts also assisted with the development of materials.

ORGANIZATION OF THE SMALL SCHOOLS MATERIALS

Book covers and objective pages for all Small Schools materials have been color-coded for each subject: Reading--green, Language Arts--yellow, Mathematics--blue, Social Studies--buff and Science--pink. Following each colored objective page there are several pages which identify activities, resources and monitoring procedures which may be used when teaching to the objectives. See page viii of this book for a more detailed explanation of the format. On that objective page all objectives for an area of the scope are identified. Within each curriculum book the objectives have been correlated to the goals for the Washington Common Schools and to the Small Schools Program Goals for that subject area.

Accompanying the Small Schools curriculum books are resource assessment booklets for reading, language arts and mathematics, grades K-3. Within each assessment booklet, test items are provided for a selected number of Small Schools objectives. The suggested test items may be used directly by teachers to assess student performance, or they may serve as models for other test items to be developed by the classroom teacher.

Another booklet containing only the Small Schools objectives is available. This booklet contains objectives for reading, language arts and mathematics, grades K-8, and for science and social studies, grades K-3. Also within this booklet are the program goals and the scope for each curriculum area.

RELATIONSHIP TO THE SLO LAW

The purpose of this book and all other Small Schools materials is to assist teachers with the improvement of curriculum and instruction. In addition, it is expected that many smaller districts lacking curriculum personnel will find this book helpful in complying with the SLO law. (This Law requires districts to identify student learning objectives and to evaluate each student's performance related to the attainment of the objectives.) Contained within this book are many more objectives than any district would choose to identify as their SLO objectives. In order to provide districts with assistance in identifying objectives which might compose their SLO list, selected objectives are marked with an asterisk (*). These objectives have been selected with the understanding that they serve only as a model when using the Small Schools materials in helping district personnel meet the requirements of the SLO Law.

For more information concerning the SLO Law, see the *Handbook for School District Implementation of the Student Learning Objectives Law* available from the office of the State Superintendent of Public Instruction.

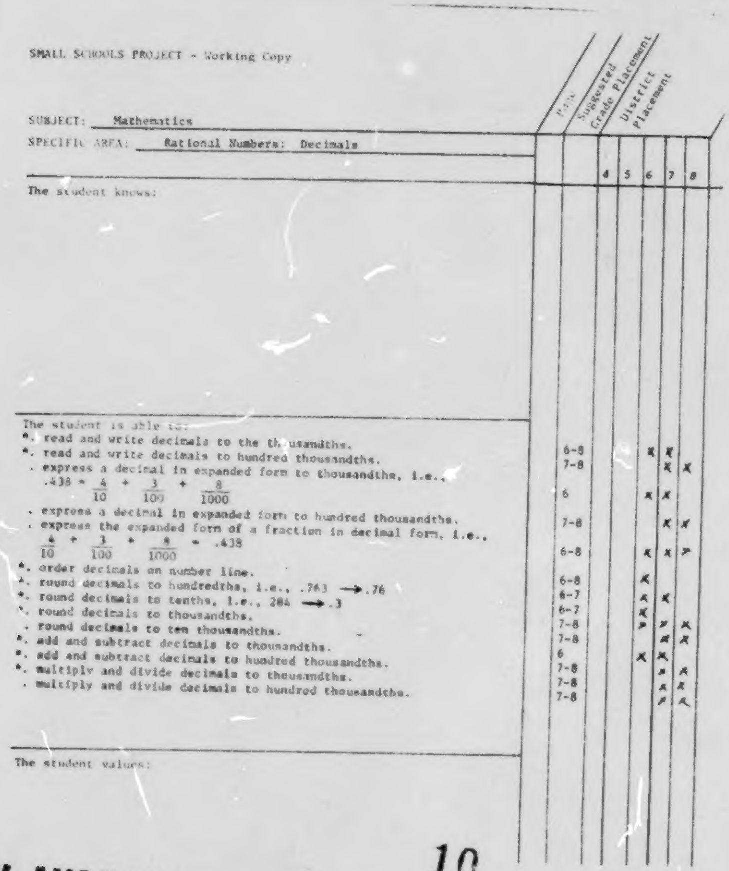
FORMAT

One unique feature of the Small Schools Curriculum is the format or arrangement of information on the page. The format was developed in order to facilitate the transportability of the product by allowing districts to personalize the curriculum materials to meet their own educational programs. The Small Schools Format provides a simple arrangement for listing objectives and identifying activities, monitoring procedures and resources used in teaching.

Page One

The first format page lists the sequence of student learning objectives related to a specific area of the curriculum for either reading, language arts, mathematics, science or social studies. For each objective a grade placement has been recommended indicating where each objective should be taught and mastered. The grade recommendation is made with the understanding that it applies to most students and that there will always be some students who require either a longer or shorter time than recommended to master the knowledges, skills and values indicated by the objectives.

Columns at the right of the page have been provided so district personnel can indicate the grade placement of objectives to coincide with the curriculum materials available in their schools. District personnel may also choose to delete an objective by striking it from the list or add another objective by writing it directly on the sequenced objective page.



SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Rational Numbers: Decimals

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
The student is able to:							
*. read and write decimals to the thousandths.		6-8			X	X	
*. read and write decimals to hundred thousandths.		7-8				X	X
. express a decimal in expanded form to thousandths, i.e., $.438 = \frac{4}{10} + \frac{3}{100} + \frac{8}{1000}$		6			X	X	
. express a decimal in expanded form to hundred thousandths.		7-8				X	X
. express the expanded form of a fraction in decimal form, i.e., $\frac{4}{10} + \frac{3}{100} + \frac{8}{1000} = .438$		6-8			X	X	X
*. order decimals on number line.		6-8			X		
*. round decimals to hundredths, i.e., .763 → .76		6-7			X	X	
*. round decimals to tenths, i.e., 284 → .3		6-7			X		
*. round decimals to thousandths.		7-8			X	X	X
. round decimals to ten thousandths.		7-8				X	X
*. add and subtract decimals to thousandths.		6			X	X	
*. add and subtract decimals to hundred thousandths.		7-8				X	X
*. multiply and divide decimals to thousandths.		7-8				X	X
. multiply and divide decimals to hundred thousandths.		7-8				X	X
The student values:							

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Page Two

On the second format page, one or more objectives from the first format page are rewritten and suggested activities, monitoring procedures and possible resources used in teaching to the objective(s) are identified. The objectives are correlated to the State Goals for Washington Common Schools and to broad K-12 program goals. The suggested grade placement of the objectives and the activities is indicated and, wherever applicable, the relatedness of an objective to other curriculum areas have been shown.

Below is an example of a completed second format page. Teachers and principals in local districts may personalize this page by listing their own resources and by correlating their district goals to the student learning objectives.

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student is able to read and write decimals to the thousandths. B. The student is able to express a decimal in expanded form to thousandths, i.e., $.438 = \frac{3}{10} + \frac{4}{100} + \frac{8}{1000}$. C. The student is able to express the expanded form of a fraction in decimal form, i.e., $\frac{4}{10} + \frac{3}{100} + \frac{8}{1000} = .438$

Related Area(s)

State Goal	1
District Goal	
Program Goal	1,3

Suggested Activities: Grade(s) 6	Suggested Monitoring Procedures	Possible Resources
Title: Decimal Expando **Group Size:** small group, entire class **Materials:** cards (3" x 5" or 3" x 3") **Procedure(s):** . Have students make a number of cards with basic numerals 1 - 9, a decimal point card, two plus sign cards, and an equal sign card. . In addition, have students make cards with expanded fraction forms of each number, i.e., $\frac{1}{10}, \frac{1}{100}, \frac{1}{1000}, \frac{2}{10}, \frac{2}{100}, \frac{2}{1000}$, etc. . Read a number and have students form the number with their cards, i.e., $\boxed{.}\ \boxed{3}\ \boxed{2}\ \boxed{5}$. Have students match the decimal number with the expanded form in fractions, i.e., $\boxed{=}\ \boxed{\frac{3}{10}}\ \boxed{+}\ \boxed{\frac{2}{100}}\ \boxed{+}\ \boxed{\frac{5}{1000}}$ **Variation:** . Reverse the procedure.	Walk among students (class) or observe (small group) to see if they have arranged cards correctly.	District adopted text. **District Resources**

DEFINITION OF FORMAT TERMS
Small Schools Curriculum Project

Subject indicates a broad course of study. The subject classifies the learning into one of the general areas of the curriculum, i.e., reading, mathematics, social studies.

Specific Area indicates a particular learning category contained within the subject. Within the subject of reading there exist several specific areas, i.e., comprehension, study skills, word attack skills.

State Goal indicates a broad term policy statement relating to the education of all students within the State of Washington. In 1972, the State Board of Education adopted 10 State Goals for the Washington Common Schools.

District Goal generally reflects the expectations of the community regarding the kinds of learning that should result from school experience. These goals are employed mainly to inform the citizenry of the broad aims of the school. When district goals are correlated to student learning objectives, community members are able to see how their expectations for schools are translated daily into the teaching/learning process of the classroom.

Program Goals are K-12 goals which do not specify grade placement. These goals provide the basis for generating subgoals or objectives for courses or units of study within a subject area. Program goals are used as a basis for defining the outcomes of an entire area of instruction such as mathematics, language arts or social studies.

Student Learning Objectives

Three major types of learning objectives which have been identified are knowledge, process and value objectives.

Knowledge Student Learning Objectives identify something that is to be known and begins with the words, "The student knows...". Knowledge objectives specify the knowledge a student is expected to learn. These objectives include categories of learning such as specific facts, principals and laws, simple generalizations, similarities and differences, etc.

An example of a Knowledge Student Learning Objective is: "The student knows guide words in a dictionary indicate the first and last words on the page."

Process Student Learning Objectives identify something the student is able to do, and begins with the words, "The student is able to...". These objectives are associated with the rational thinking processes of communication, inquiry, problem solving, production, service and human relationships.

An example of a Process Student Learning Objective is: "The student is able to associate a consonant sound with the letter name."

Definition of Format Terms
continued

> Value Student Learning Objectives identify only the type of values which foster the context of the discipline. These objectives are thought to be most uniformly and consistently approved by society as supporting the major aims of the discipline.
>
> An example of a Value Student Learning Objective is: "The student values reading as a worthwhile leisure time activity."

Suggested Learning Activities describe the behavior of both the teacher and students. The instructional strategies employed by the teacher, as well as the activities undertaken by the students, are included in this section. Each activity includes materials, group size and procedures.

Suggested Monitoring Procedures indicate informal methods for determining the progress a student is making towards the attainment of the objective. These methods include techniques such as teacher observation, student interest and attitude surveys and recording results of classroom instruction.

Possible Learning Resources indicate materials, teacher made or commercially produced, which are needed by both the teacher and students in order to accomplish the learning activities.

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GOALS FOR THE WASHINGTON COMMON SCHOOLS

1. As a result of the process of education, all students should have the basic skills and knowledge necessary to seek information, to present ideas, to listen to and interact with others, and to use judgment and imagination in perceiving and resolving problems.

2. As a result of the process of education, all students should understand the elements of their physical and emotional well-being.

3. As a result of the process of education, all students should know the basic principles of the American democratic heritage.

4. As a result of the process of education, all students should appreciate the wonders of the natural world, human achievements and failures, dreams and capabilities.

5. As a result of the process of education, all students should clarify their basic values and develop a commitment to act upon these values within the framework of their rights and responsibilities as participants in the democratic process.

6. As a result of the process of education, all students should interact with people of different cultures, races, generations, and life styles with significant rapport.

7. As a result of the process of education, all students should participate in social, political, economic, and family activities with the confidence that their actions make a difference.

8. As a result of the process of education, all students should be prepared for their next career steps.

9. As a result of the process of education, all students should use leisure time in positive and satisfying ways.

10. As a result of the process of education, all students should be committed to life-long learning and personal growth.

MATHEMATICS PROGRAM GOALS
(K-12)

1. The student values the study of mathematics for its usefulness and application to everyday life.

2. The student develops the ability to communicate with precision and confidence using the vocabulary and symbols unique to mathematics.

3. The student develops the concept of number and numeration including counting, place value, reading and writing numbers, various numbering systems, number theory and scientific notation.

4. The student develops general mathematical concepts of time-space relationships; equality-inequality; measurement; function; graphs, charts and tables; probability and statistics; and geometry.

5. The student develops accuracy in using the computational skills of adding, subtracting, multiplying and dividing.

6. The student develops the ability to use problem-solving techniques.

7. The student develops the knowledge and use of the structure of mathematical systems and real numbers.

8. The student knows and is able to use the symbols, elements, operations and structure of the following number systems: whole numbers, integers, rational numbers, real numbers and complex numbers.

MATHEMATICS
SCOPE (K-8)

I. WHOLE NUMBERS

A. Counting (Serial, Objects, Order) -- K-3 ....
B. Equality and Inequality -- K-6 1
C. Reading and Writing Numerals -- K-6 11
D. Place Value -- K-6 25
E. Addition -- K-8 43
F. Subtraction -- 1-8 53
G. Multiplication -- 3-8 63
H. Division -- 3-8 85
I. Story Problems -- 2-8 117

II. INTEGERS -- 7-8 ....

III. RATIONAL NUMBERS

A. Common Fractions -- K-8 137
B. Ratios, Percentage, Proportion -- 6-8 171
C. Decimals -- 6-8 175

IV. REAL NUMBERS -- 7-8 ....

V. ALGEBRAIC EXPRESSION -- 7-8 ....

VI. NUMERATION

A. Number Theory -- 4-8 187
B. Scientific Notation, Exponents 205

VII. GEOMETRY

A. K-3 215
B. Two-Dimensional Shapes -- 4-8 217
C. Three-Dimensional Shapes -- 4-8 235
D. Points, Lines, Line Segments -- 4-8 241
E. Angles, Triangles -- 5-8 257
F. Circles -- 4-8 273
G. Perimeter -- 4-8 279
H. Area -- 6-8 285
I. Volume -- 7-8 ....

VIII. GRAPHS -- K-8 297

IX. PROBABILITY AND STATISTICS -- 4-8 319

X. MEASUREMENTS

A. Time -- K-8 327
B. Money -- 1-6 337
C. Linear -- 3-8 353
Metric -- 4-8 365
D. Capacity -- 4-8 391
Capacity (Volume) 1-4 415
E. Weight -- 4-8 419
F. Temperature -- 3-8 449
G. Maintenance of English Measurement -- 4-8 455

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SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Whole Numbers: Equality and Inequality

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. the symbol " = " means "equal to."	3	4-6					
. the symbol " > " means "greater than."	3	4-6					
. the symbol " < " means "less than."	3	4-6					
. the symbol " ≠ " means "not equal to."	3	4-6					
The student is able to:							
. compare numbers to 100,000 by use of symbols ">," "<," " =."	3	4-5					
. compare numbers to 1,000,000 by use of the symbols ">," "<," "=."	5	5-6					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ________________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the symbol " = " means "equal to." The student knows the symbol ">" means "greater than." C. The student knows the symbol "<" means "less than." D. The student knows the symbol " ≠ " means "not equal to." E. The student is able to compare numbers to 100,000 by use of symbols ">," "<," " = ."

Related Area(s)

State Goal	1
District Goal	
Program Goal	2,3,8

Suggested Activities: Grade(s) 4-6

Title: Which Ones Are The Same?
Group Size: small group, entire class
Materials: paper, pencil, worksheets

Procedure(s):

- Make a worksheet following the example shown below.
- The students are to put = or ≠ in the box between the number sentences.
- Do not use a figure above 100,000.

Example:

Make the sentences true by putting ≠ or = in each box.

50 x 2000 ☐ 40 x 2500 ; 75 x 500 ☐ 55 x 750

Title: Make 'em True
Group Size: small group, entire class
Materials: pencil, paper, worksheets

Procedure(s):

- Make up a worksheet following the example shown below.
- The students are to put >, < or = in the box between the number. Do not use a figure under 100,000.

Example:

Make the sentences true by putting >, < or = in each box.

732,460 ☐ 730,460   568,220 ☐ 628,220

Suggested Monitoring Procedures

Observation of this activity.

Use a worksheet with numbers to 100,000, and have students compare two numbers using >, =, < and ≠.

Observation of the activity

Use a worksheet with numbers to 1,000,000 and have students compare two numbers using >, <, = , and ≠ .

Possible Resources

The Numbers 0-999,999
Topic 57, Wisconsin Research and Development Center for Cognitive Learning, Rand, McNally.

District Resources

Suggested Activities: Grade(s) ______

Title: Inequality Match
Group Size: entire class
Materials: worksheet

Procedure(s):

- Make a worksheet with two columns. Column A with any number between 1 and 100,000; Column B the same.
- Students are to put =, >, or < symbols in spaces between numbers.

Example:

A	B
92,546	93,781
2,006	2,010
635	549
69,973	69,699

Title: Equal or Not Equal--This Is The Question!
Group Size: entire class
Materials: worksheet

Procedure(s):

- Make a worksheet with two columns. Both columns have math problems (either +, -, x, ÷) with a space in between.
- Make the worksheet with more difficult problems for those students able to employ these skills.
- Make some problem answers equal, and some not equal.
- Students are to do math problems and to fill the spaces between them with either = or ≠ (for equal to and not equal to).

Example:

A	= or ≠	B
5 / 100		13 + 12
250 ÷ 5		68 - 24
90 x 4		200 + 68
645 ÷ 3		969 - 754
541 x 25		12,100 + 1,425

Suggested Monitoring Procedures

Teacher observes and corrects students as necessary.

Possible Resources

District adopted text.

District Resources

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the symbol " = " means "equal to." B. The student knows the symbol ">" means "greater than." C. The student knows the symbol "<" means "less than." D. The student knows the symbol "≠" means "not equal to." E. The student is able to compare numbers to 1,000,000 by use of the symbols ">," "< ."

Related Area(s)

State Goal	1
District Goal	
Program Goal	2,3,8

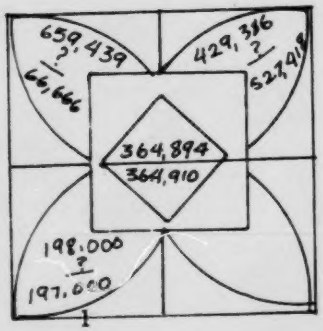
Suggested Activities: Grade(s) 4-6

Title: Color Equality
Group Size: entire class
Materials: worksheet, crayons

Procedure(s):

- Make up a worksheet with a design (with many shapes within) covering the entire page. (More complicated design for more able students.)
- Each different shape has an inequality-equality problem within.
- Set up color or colors to stand for > ; the same for < and = (see example).
- Have students do problems to decide whether the problem is >, =, or <.
- Students then fill in shapes with appropriate colors.
- Symmetry in design helps make more interesting patterns.

Example: > (red), < (yellow), = (blue)



Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) ______

Title: Compare It

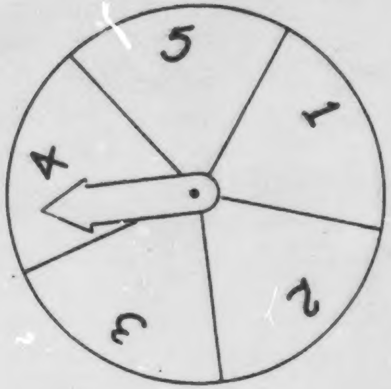
Group Size: two to six students

Materials: spinner, marked 1-5 (see example); five dice (see pattern attached)

Procedure(s):

- Make octahedral-shaped dice (see pattern), and number 0-9, but omitting some numbers from each die, i.e., 0,1,4,5,6,7,8,9.
- Have students spin spinner to find the number of dice to be thrown (1, 2, 3, 4 or 5).
- Player throws dice and records numbers as they land.
- Player throws dice again and records new number. He/she inserts > or < between two numbers.
- If correct player gets one point.
- If not, the player loses next turn.
- Winning score is 25.

Example of spinner:



Suggested Monitoring Procedures

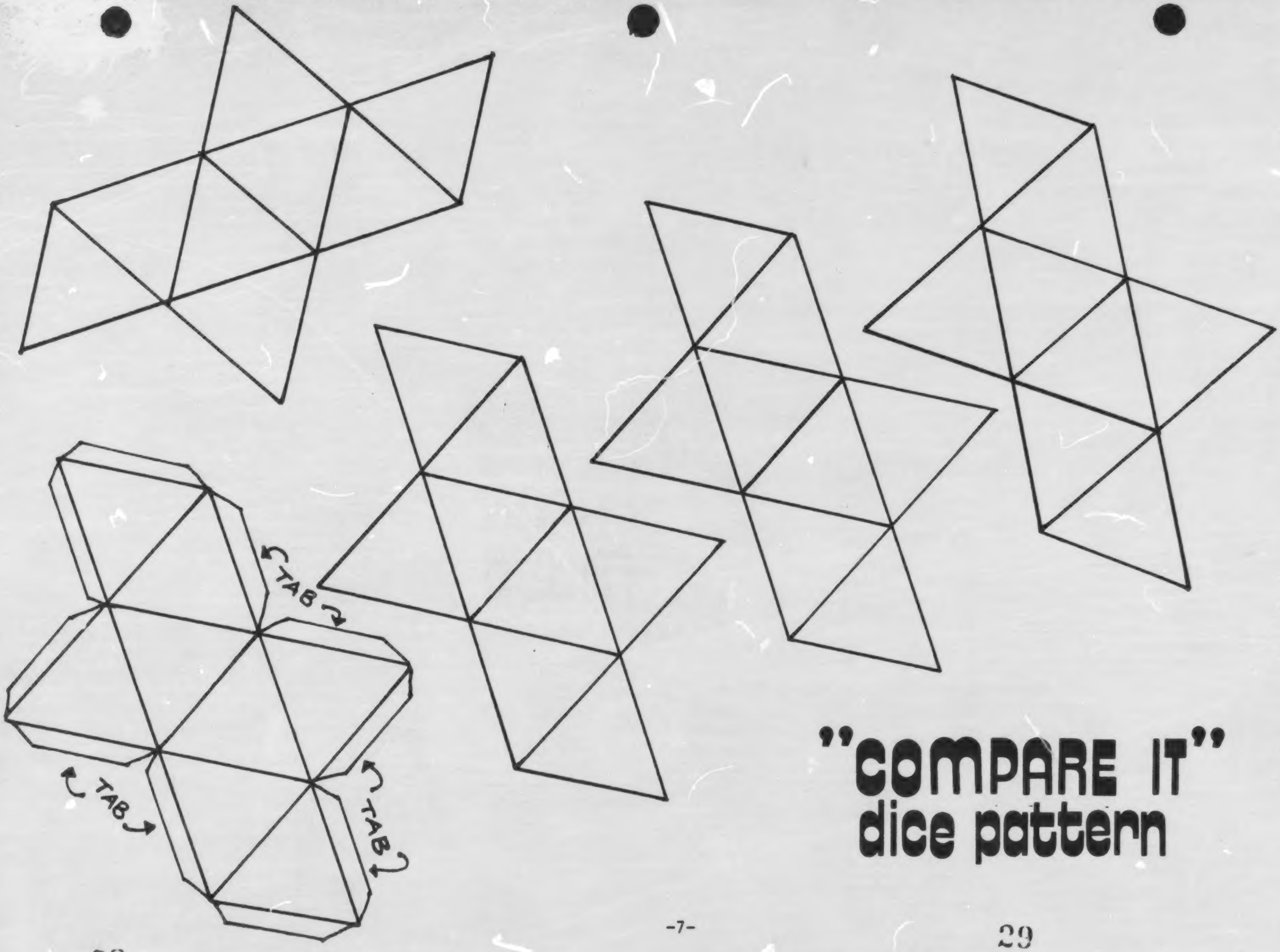
Observe the activity.

Use a worksheet with numbers to 100,000 and have students mark the correct symbol <, >, =, in comparing two numbers.

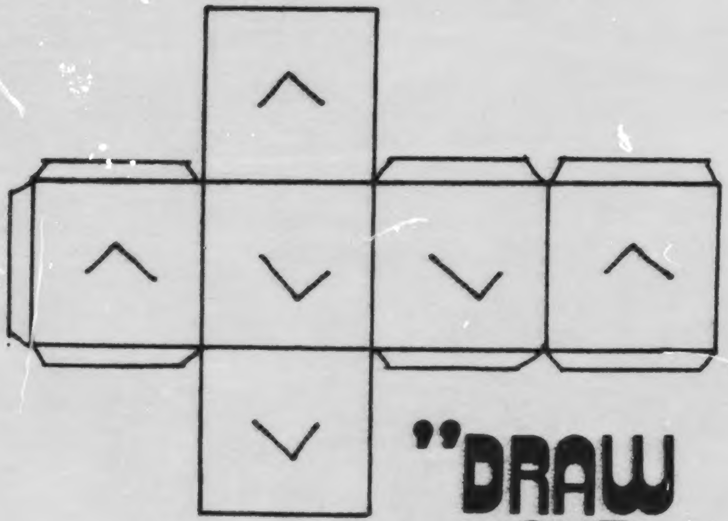
Possible Resources

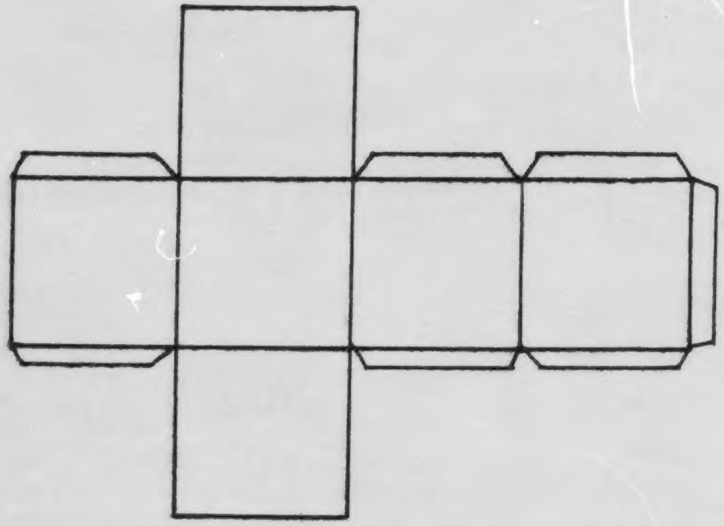
District adopted text

District Resources

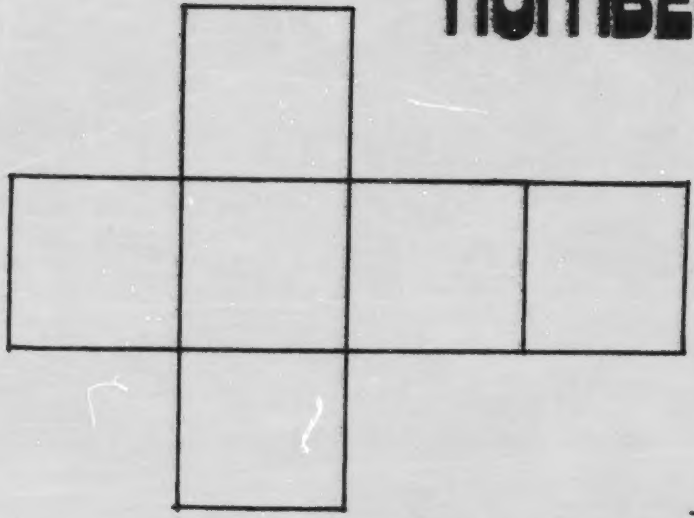


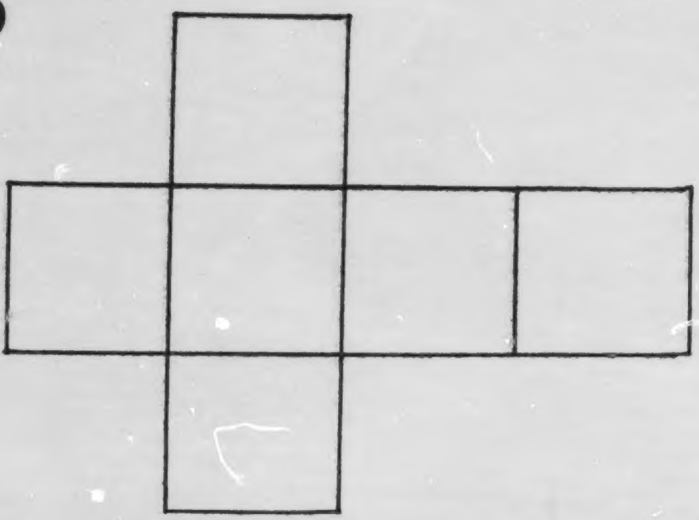
"COMPARE IT"
dice pattern





"DRAW YOUR NUMBERS"





Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the symbol " = " means "equal to." B. The student knows the symbol ">" means "greater than." C. The student knows the symbol ">" means "less than." D. The student knows the symbol " ≠ " means "not equal to." E. The student is able to compare numbers to 1,000,000 by use of the symbols ">", "<", " = ."

State Goal	1
District Goal	
Program Goal	2,3,8

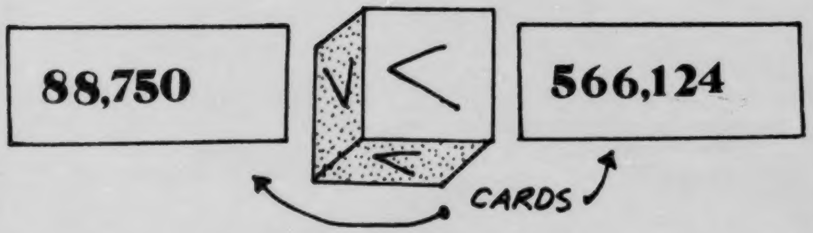
Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Draw Your Numbers
Group Size: groups of two to six
Materials: small cards with numbers from one to 999,999, one die marked >,< (see diagram on page 8)

Procedure(s):

- Students draw two cards from stack.
- A student rolls the die and arranges cards on either side of die to make a true statement. One point is allowed for each true statement.
- Students alternate turns until one player scores 21.



Suggested Monitoring Procedures

Worksheet with numbers to 1,000,000, with students using >, =, < and ≠ to compare numbers.

Observe the activity.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
		District Resources
34		35

SUBJECT: **Mathematics**

SPECIFIC AREA: **Whole Numbers: Reading and Writing Numerals**

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. the equivalents for the major Roman numerals (I=1, V=5, X=10).	13	4-5					
. the equivalents for the major Roman numerals (X=10, L=50, C=100, D=500, M=1,000).	13	5-6					
The student is able to:							
. read any of the numerals to 9,999.		3-4					
. read any of the numerals to a hundred thousand.	15	4-5					
*. read any of the numerals to a million.	17	5-6					
. read any of the numerals to a billion.	19	5-6					
. read any of the critical number words, i.e., ones, tens, hundreds, ten, twenty, thirty, etc.		2-4					
. read any of the critical number words: thousands, hundred thousands, millions, billions.	21	4-6					
. write any of the numerals to a hundred thousand.	15	4-5					
*. write any of the numerals to a million.	17	5-6					
. write any of the numerals to a billion.	19	5-6					
*. read and write Roman numerals I-X.	13	4-5					
. read and write the major Roman numerals, X, L, C, D, M.	13	5-6					
The student values:							
. the ability to read and write numerals as a usefull skill in daily living.		4-8					

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ______________

38

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Suggested Objective Placement 4-5

Student Learning Objective(s) A. The student knows the equivalents for the major Roman numerals (I=1, V=5, X=10). B. The student knows the equivalents for the major Roman numerals (X=10, L=50, C=100, D=500, M=1,000.) C. The student is able to read and write Roman numerals I-X. D. The student is able to read and write the major Roman numerals X, L, C, D, M.

State Goal	1
District Goal	
Program Goal	2,3

Related Area(s)

Suggested Activities: Grade(s) 4-5	Suggested Monitoring Procedures	Possible Resources

Title: I to C.
Group Size: entire class
Materials: worksheet

Procedure(s):

. After basic instruction regarding Roman numerals I through X, show how subsequent numbers are constructed or built, resulting in the "patterns" to be seen from left to right or top to bottom in each column.

. Instruct regarding L, C, D and M.

. Have students complete the chart of Roman numerals 1-20.

I	II	III		V
			IX	
				XX

. Have students complete the chart of Roman numerals X - C by tens.

X		X
	XX	
LX		
C		

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
NOTE: Give students clues for remembering major Roman numerals, i.e.: . What is the first letter one encounters half way through the word "half"? (L) . What is the first letter of the coin that takes 100 of to make a dollar? (C)ent		
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-5

Student Learning Objective(s) A. The student is able to read any of the numerals to a hundred thousand. B. The student is able to write any of the numerals to a hundred thousand.

State Goal	1
District Goal	
Program Goal	2,3

Related Area(s)

Suggested Activities: Grade(s) 4-5	Suggested Monitoring Procedures	Possible Resources

Title: Number, Please!
Group Size: small groups, entire class
Materials: twelve sets of cards with each set numbered 0-9

Procedure(s):

- . Two teams of six students are selected with each student having a set of numered cards.
- . A number having two to six digits is put on the board in words.
- . Each team tries to duplicate that number, and the first to do so wins.

Variations:

- . Class writes (in words) numbers that have been arranged by a team (or recites).
- . Boys vs. girls, students arrange the teams to form certain numbers.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

45

46

Suggested Objective Placement 5-6

Student Learning Objective(s) A. The student is able to read any of the numerals to a million.

B. The student is able to write any of the numerals to a million.

State Goal	1
District Goal	
Program Goal	2,3

Related Area(s)

Suggested Activities: Grade(s) 5-6

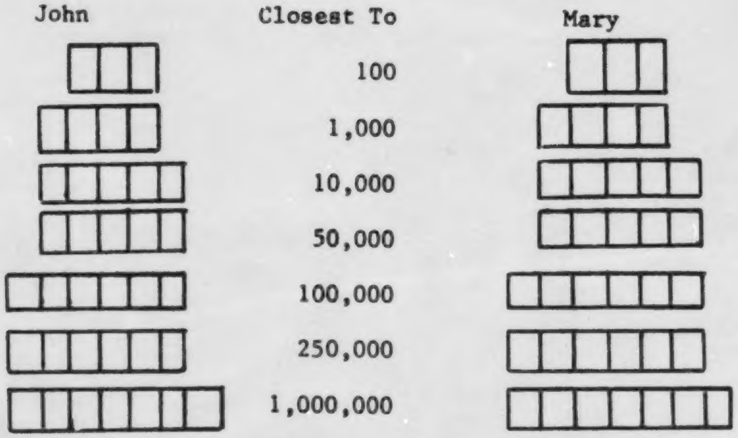
Suggested Monitoring Procedures

Possible Resources

Title: Roll a Number
Group Size: groups of two, entire class
Materials: one set of dice per group, game sheet

Procedure(s):

- First player rolls the dice and writes the number shown into any of the boxes under his/her name (10 = 0, 11 = 1, 12 = 2).
- Second player does the same and records the number in any square under his/her name.
- The two players continue rolling the dice and recording the numbers.
- When all spaces are filled, the player who has made the most numbers closest to the given number is the winner.



District Resources

Suggested Activities: Grade(s) 5-6

Title: Make A Number
Group Size: small groups, entire class
Materials: deck of cards, labeled 0→9 about 50, paper strip

Millions	Hundred Thousands	Ten Thousands	Thou-sands	Hun-dreds	Tens	Units

Procedure(s):
- Each player has a strip as shown above, face up in front of him/her.
- Each player draws from the deck, one card at a time and places it on one of the place value spots of this strip.
- When all spots are filled, the player with the highest number wins that round.
- The first player to win a determined number of rounds, or is ahead at the end of the time limit, is the winner.

49

Suggested Monitoring Procedures

Possible Resources

SEAMATH: Seattle Mathematics Program: K-6, Seattle Public Schools, 815 Fourth North, Seattle, Wash. 98109, 1975.

District Resources

50

Suggested Objective Placement 5-6

Student Learning Objective(s) A. The student is able to read any of the numerals to a billion.

B. The student is able to write any of the numerals to a billion.

State Goal	1
District Goal	
Program Goal	2,3

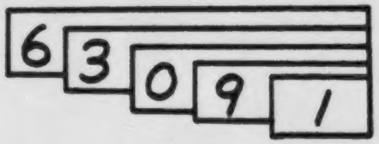
Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Number Draw
Group Size: small groups, entire class
Materials: paper strips 1-inch wide

Procedure(s):

- Cut out paper strips of various lengths (one to nine inches). Each strip should be divided into one-inch squares.
- Write the numbers 0 - 9 on the 1" by 1" strips.
- Write the numbers 00 - 90 on the 2" by 1" strips.
- Write the numbers 000 - 900 on the 3" by 1" strips.
- Continue until 000,000,000 - 1,000,000,000.
- Have the students draw a determined number of strips.
- Have him/her place them on top of each other as shown:



- Have the student read the number in a predetermined time limit.
- This format can be used with students individually or in various team games.

Suggested Monitoring Procedures

Individually -- observation

Group -- successful cooperation in a game

Possible Resources

SEAMATH: Seattle Mathematics Program: K-6, Seattle Public Schools, 815 Fourth North, Seattle, Wash. 98109, 1975.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
53		**District Resources** 54

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Suggested Objective Placement 4-6

Student Learning Objective(s) The student is able to read any of the critical number words (thousands, hundred thousands, millions, billions).

State Goal	1
District Goal	
Program Goal	2,3,8

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title:
Group Size: small groups, entire class
Materials: chalkboard, nine sets of number cards, each set being 0→9

Procedure(s):

. Across the chalkboard arrange number period titles as follows:

BILLIONS			MILLIONS			THOUSANDS			UNITS		
100	10		100	10		100	10				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	TENS	ONES

. A large number is read aloud several times by the teacher or a student.
. Teams arrange themselves to illustrate that number.
. Teams are timed to determine winner in races.

Variation:

. Team arranges itself, and the class writes down the number illustrated.

Suggested Monitoring Procedures

Observation of students in group activities.

Individual check of students using pages from the text.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SUBJECT: **Mathematics**

SPECIFIC AREA: **Whole Numbers: Place Value**

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. the place value of ones and tens in base numeration.		1-2					
. the place value of hundreds in base ten numeration is the third numeral from the right.		2-3					
. the place value of thousands in base ten numeration is the fourth numeral from the right.		3-4					
The student is able to:							
*. write the expanded form of any two-digit number, i.e., 34 = three tens + four ones.		1-2					
. write the corresponding numeral from any two-digit number written in expanded form, i.e., three tens + four ones = 34.		1-2					
*. write the expanded form of any three-digit number, i.e., 342 = three hundreds + four tens + two ones.		2-3					
. write the corresponding numeral from any three-digit number written in expanded form, i.e., three hundreds + four tens + two ones = 342.		2-3					
*. write the expanded form of any four-digit number, i.e., 4,322 = four thousands + three hundreds + two tens + two ones.		3-4					
. write the corresponding numeral from any four-digit number written in expanded form, i.e., four thousands + three hundreds + two tens + two ones = 4,322.		3-4					
*. round numbers to the nearest ten and hundred.		3-4					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ______________

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Whole Numbers: Place Value

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. the place value of ten thousands in base ten numeration is the fifth numeral from the right.	27	4-5					
. the place value of hundred thousands in base ten numeration is the sixth numeral from the right.	32	4-5					
. the place value of millions in base ten numeration is the seventh numeral from the right.	35	5-6					
. the place value of billions in base ten numeration is the tenth numeral from the right.	39	5-6					
The student is able to:							
* . write the expanded form of any five-digit number, i.e., 12,362 = twelve thousands + three hundreds + sixty tens + two ones.	27	4-5					
* . write the expanded form of any six-digit number, i.e., 126,422 = one hundred twenty-six thousands + four hundreds + two tens + two ones.	33	4-5					
* . write the expanded form of any seven-digit number, i.e., 1,222,621 = one million + two hundred twenty-two thousands + six hundreds + two tens and one.	35	5-6					
. write the expanded form of any ten-digit number, i.e., 4,333,222,231 = four billions + three hundred thirty-three millions + two hundred twenty-two thousands + two hundreds + three tens and one.	39	5-6					
* . round numbers to the nearest ten, hundred, thousand, million, billion.	41	4-6					
The student values:							

C2

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ____________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-5

Student Learning Objective(s) A. The student knows the place value of ten thousands in base ten numeration is the fifth numeral from the right. B. The student is able to write the expanded form of any five-digit number i.e., 12,362 - twelve thousands + three hundreds + sixty tens + two ones.

State Goal	1
District Goal	
Program Goal	2,3,7

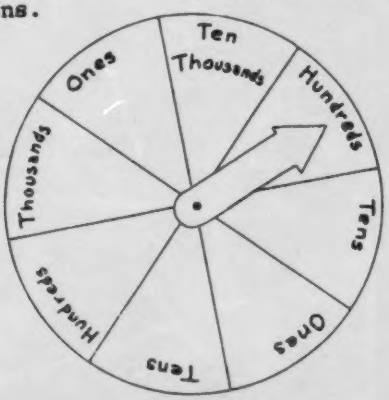
Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Place Value Spin
Group Size: six students
Materials: place value spinner, score sheet (their own paper), place value chart, six number cards (see example)

Procedure(s):
- Each student chooses a different number card.
- He/she marks six spaces on his/her score sheet.
- One player spins the dial on the place value wheel.
- Each person looks at the first number on his/her card and locates the numeral in the place as is indicated by the word where the dial is pointing.

  Example:
  Spin reads "hundreds"; players check cards, find hundreds column, Card A-6 (22,651) a six is recorded on first line on score card.
- Players alternate spinning the wheel. On second spin, refer to second number on card.
- After six spins, each player adds up score on score sheet. High score wins.



Suggested Monitoring Procedures

Give students a list of five-digit numbers and have them write the expanded form similar to the example in the objectives.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

Suggested Monitoring Procedures

Possible Resources

PLACE VALUE CHART

2 6 4 7 9

nine ones——9

seven tens——70

four hundreds——400

six thousands—— 6,000

two ten thousands——20,000

Number Card A	
1	22,651
2	43,425
3	363
4	54,142
5	6,004
6	15,536

Number Card B	
1	40,421
2	51,356
3	65,010
4	16,102
5	3,235
6	34,644

Sample Score Sheet

$$\begin{array}{r} 4 \\ 2 \\ 3 \\ 4 \\ 1 \\ 6 \\ +5 \\ \hline 25 \end{array}$$

Number Card C	
1	11,313
2	62,020
3	23,441
4	666
5	34,154
6	46,535

Number Card D	
1	40,123
2	52,430
3	23,054
4	34,342
5	66,616
6	5,565

Number Card E	
1	123
2	40,616
3	12,440
4	34,361
5	53,234
6	65,555

Number Card F	
1	22,443
2	1,504
3	35,060
4	66,152
5	41,216
6	53,325

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-5

Student Learning Objective(s) A. The student knows the place value of ten thousands in base ten numeration is the fifth numeral from the right. B. The student is able to write the expanded form of any five-digit number. i.e., 12,362 = twelve thousands + three hundreds + sixty tens + two ones.

State Goal	1
District Goal	
Program Goal	2,3,7

Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Chip Trading Activities

Group Size: entire class

Materials: large quantities of colored chips in four different colors (large lima beans which have been spray painted with enamel by the students or materials collected and/or made by the students themselves have more meaning), dice or counting cubes of some sort, paper tills (a till can be easily made by ruling four columns of equal width on a piece of 9" x 11" paper, and labeling or coloring each column with the appropriate color), pencil, paper on which to record data (if an activity is worth doing it is worth recording)

Red	Green	Blue	Yellow

Procedure(s):

- Chip trading is used to extend the concept of place value. It involves physical manipulation of countable objects such as colored chips, beans or tiles.
- Involve students in the following games which involve chip trading. For additional game ideas see Chip Trading listed in suggested resources.

Suggested Monitoring Procedures

Possible Resources

Source: Chip Trading Activities, Davidson
Colton Fair;
Scott Resources, Inc.

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

Suggested Monitoring Procedures

Possible Resources

1. Banker's Game I
   - For every group of four, students select a banker.
   - The banker places all the colored chips in the appropriate divisions of his/her till.
   - Each player takes a paper till. Ask everyone to imagine they are visiting a foreign country. The country has the following money system:

     Money is exchanged on a 3 for 1 trade.

     3 yellow = 1 blue
     3 blue = 1 green
     3 green = 1 red
   - The player on the banker's left begins the game by rolling a die and asking the banker for that number of yellow chips that appear on the die.
   - Players should make any and all possible exchanges
   - Students continue playing in turn, making all possible exchanges each time.
   - The first player to obtain a red chip is declared the winner.
   - Continue the game until students are secure with counting and making trades.

2. Finding the Value
   - Have students place chips in appropriate sections of their till. Have students record results in terms of yellow chips.

     Trades are 3 for 1

     2 blue + 1 yellow = ______yellow
     1 green + 1 blue + 2 yellow = ______yellow
     2 green + 2 blue + 1 yellow = ______yellow
     1 red + 1 green + 2 blue + 2 yellow = ______yellow
     1 red + 1 blue = ______yellow

3. Finding All The Ways
   - Using chips, and trading 3 for 1 (or any trade students want to use), have them find all the ways to have a value of:

     10 yellow
     12 yellow
     15 yellow
     19 yellow
     25 yellow
     30 yellow

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-5

Student Learning Objective(s) A. The student knows the place value of ten thousands in base ten numeration in the fifth numeral from the right. B. The student is able to write the expanded form of any five-digit number i.e., 12,362 = twelve thousands + three hundreds + sixty tens + two ones.

State Goal	1
District Goal	
Program Goal	2,3,7

Related Area(s)

Suggested Activities: Grade(s) 4-5

Chip Trading Activities continued

- Have students record all of their results on a chart like the one below.

Red	Green	Blue	Yellow
			10
		1	7
		.	.
		.	.

- Have students place a check next to the one that has the fewest number of chips.
- Ask how many chips are in each collection? Do the students see any patterns?

4. Finding Certain Ways
- Using a 3 for 1 trade, have students place each of the following on their till.

4 chips worth 10 yellow
3 chips worth 13 yellow
19 chips worth 27 yellow
15 chips worth 37 yellow
5 chips worth 33 yellow
27 chips worth 55 yellow
6 chips worth 78 yellow

- Students record all of their results on a chart.
- Ask them if it is possible to do any of these in more than one way?

For additional chip trading activities, see: Chip Trading Activities under suggested resources.

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) _______

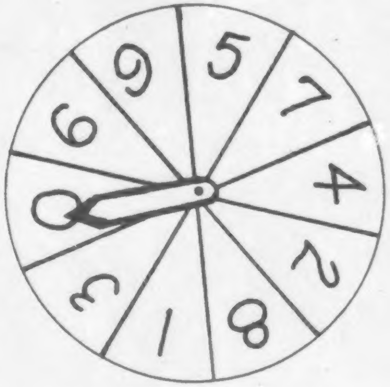
Title: Winner Spin I
Group Size: entire class
Materials: transparency spinner numbered 0-9, overhead projector

Procedure(s):

- Each student has a sheet of notebook paper and pencil.
- Five short lines are drawn on each paper ___ ___ ___ ___ ___.
- The objective of the game is to create the largest possible number in five spins.
- The spinner is spun.
- Each student chooses the line on their own paper on which to put the digit. The spinner is spun again and again. On each spin the students must choose where to put the digit.
- After five spins, the teacher asks one student to read his/her numeral.
- Students with largest numbers are called upon to read their numerals.

Variation:

- Play "Winner Spin I" in small groups using a spinner made from construction paper or tagboard and a brad.



Suggested Monitoring Procedures

Listen to the numbers read.

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-5

Student Learning Objective(s) A. The student knows the place value of hundred thousands in base ten numeration is the sixth numeral from the right. B. The student is able to write the expanded form of any six-digit number i.e., 126,422 = one hundred twenty-six thousands + four hundreds + two tens + two ones.

State Goal	1
District Goal	
Program Goal	2,3

Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Winner Spin II
Group Size: entire class
Materials: overhead projector, spinner board transparency, notebook, paper, pencil

Procedure(s):

- Each student has a sheet of notebook paper and pencil.
- Six short lines are drawn on each paper ___ ___ ___ ___ ___ ___.
- The object of the game is to create the largest number possible in six spins.
- The spinner is spun.
- The student chooses the line on which to put the digit and puts it down.
- It is spun again and again as student chooses where to place it.
- After six spins, individuals are asked to read their numerals. The student with the largest number wins.

Title: Expando
Group Size: pairs
Materials: twenty laminated tagboard cards (3/4" x 3"), one laminated 9" x 12" tagboard card

Procedure(s):

- On each of the twenty tagboard cards type a

Suggested Monitoring Procedures

Listen to the numbers read.

Check the completed 9" x 12" sheet.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
different six digit numeral. The first digit of each should be the same to make the task more challenging. . On the 9" x 12" card, type out twenty matching numbers in expanded form. . Student draws a card out of a container and matches it to the expanded number. . This is repeated until all the 3/4" x 3" cards are used.		
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-5

Student Learning Objective(s) A. The student knows the place value of hundred thousands in base ten numeration is the sixth numeral from the right. B. The student is able to write the expanded form of any six-digit number i.e., 126,422 = one hundred twenty-six thousands + four hundreds + two tens + two ones.

State Goal	1
District Goal	
Program Goal	2,3

Related Area(s) ____________

Suggested Activities: Grade(s) 4-5

Title: Winner Spin II
Group Size: entire class
Materials: overhead projector, spinner board transparency, notebook, paper, pencil

Procedure(s):

- Each student has a sheet of notebook paper and pencil.
- Six short lines are drawn on each paper ___ ___ ___ ___ ___ ___.
- The object of the game is to create the largest number possible in six spins.
- The spinner is spun.
- The student chooses the line on which to put the digit and puts it down.
- It is spun again and again as student chooses where to place it.
- After six spins, individuals are asked to read their numerals. The student with the largest number wins.

Title: Expando
Group Size: pairs
Materials: twenty laminated tagboard cards (3/4" x 3"), one laminated 9" x 12" tagboard card

Procedure(s):

- On each of the twenty tagboard cards type a

Suggested Monitoring Procedures

Listen to the numbers read.

Check the completed 9" x 12" sheet.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
different six digit numeral. The first digit of each should be the same to make the task more challenging. . On the 9" x 12" card, type out twenty matching numbers in expanded form. . Student draws a card out of a container and matches it to the expanded number. . This is repeated until all the 3/4" x 3" cards are used.		
		District Resources

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Suggested Objective Placement 5-6

Student Learning Objective(s) A. The student knows the place value of millions in base ten numeration is the seventh numeral from the right. B. The student is able to write the expanded form of any seven-digit number, i.e., 1,222,621 = one million + two hundred twenty-two thousands + six hundreds + two tens and one.

State Goal	
District Goal	
Program Goal	2,3

Related Area(s) ______

Suggested Activities: Grade(s) 5-6

Title:	Winner Spinner III
Group Size:	entire class
Materials:	overhead projector, spinner board transparency, notebook paper, pencil

Procedure(s):

- Each student has a sheet of notebook paper and pencil.
- Nine short lines are drawn on each paper __ __ __ __ __ __ __ __ __.
- The object of the game is to create the largest possible number in nine spins.
- The spinner is spun.
- Each student chooses the line on their own paper on which to put the digit. The spinner is spun again. On each spin the students choose where to put the digit.
- After nine spins, the teacher asks one student to read his/her numeral.
- Students with largest numbers are called upon to read their numerals.

Variation:

- Play "Winner Spin III" in small groups using a spinner made from construction paper or tagboard and a brad.

Suggested Monitoring Procedures

Listen to the numbers read.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

87

93

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Suggested Objective Placement 5-6

Student Learning Objective(s) A. The student knows the place value of millions in base ten numeration is the seventh numeral from the right. B. The student is able to write the expanded form of any seven digit number, i.e., 1,222,621 = one million + two hundred twenty-two thousands + six hundreds + two tens and one.

Related Area(s) ______

State Goal	1
District Goal	
Program Goal	3,7

Suggested Activities: Grade(s) 5-6

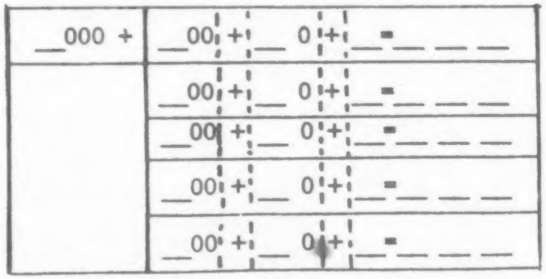
Title: Expanded Notation Strips
Group Size: individual
Materials: Expanded Notation Strip 8" x 12" worksheet (make the plus signs wide enough to cover the zeros)

Procedure(s):

. Cut the strips apart on the solid lines. Fill in the blank spaces ahead of time with any numeral 0-9.

Example:

If a three is placed on the line followed by two zeros, a seven is placed on the line followed by one zero and a two is placed in the blank with no zero. It will read 300 plus 70 plus 2. Then fill in the three blanks following the equal sign so that the two sides are equal; that is 300+70+2=372. Fold on the dotted lines so that the + sign does not show. Plus signs will cover the zero. Check to see if you are correct. It should now read 372 + 372.



Suggested Monitoring Procedures

Paper and pencil test with items like the following:
3567=(3) thousands (5) hundreds (6) tens (7) ones
and
5 thousand 4 hundreds 0 tens and 3 ones = 5,403.

Circle the number that has 6 hundreds:
3762 6372 7632 3726

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

Suggested Monitoring Procedures

Possible Resources

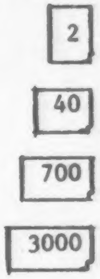
Title: Expanded Notation Cards
Group Size: small group, entire class
Materials: cut a set of Expanded Notation Cards (be sure that they fit together)

Procedure(s):

- Place the cards so that the longest is on the bottom up to the shortest on the top. The notch on the lower right corner of each card should match. When they are all together, they are in their compact form.
- Teacher calls out a 3 or 4 digit number. Student then puts the appropriate cards together to show the number.

  Example:

  Teacher says 3,742. The student puts down 3,000, places 700 on top, then 40 on that and finishes by placing 2 on the very top. By holding the number at the notched corner, the student can display 3742. The teacher should be sure to include some numbers with zero in them. For 3402, the student would have no tens card, but only 3,000, 400, and 2.



District Resources

Suggested Objective Placement 5-6

Student Learning Objective(s) A. The student knows the place value of billions in base ten numeration is the tenth numeral from the right. B. The student is able to write the expanded form of any ten-digit number i.e., 4,333,222,321 = four billions + three hundred thirty-three millions + two hundred twenty-two thousands + two hundreds + three tens and one.

State Goal	1
District Goal	
Program Goal	2,3

Related Area(s) ______

Suggested Activities: Grade(s) 5-6

Title: Pick the Place
Group Size: entire class (minimum of 20)
Materials: two sets of the digits 0-9 written on large sheets of paper, teachers cards with all place names from ones to billions on them

Procedure(s):

. Divide class so there are two teams of ten each. The remaining students are divided in two groups as judges for the teams' answers. The judges are assigned a team.
. Each student on a team has a sheet with one digit on it.
. They line up with the teams facing one another (not in alphabetical order).
. The teacher draws a place value card. The person whose last name is alphabetically first on Team I must tell the number of the student whose place on Team II corresponds to his/her place.
. The place value slip is returned to its stack.
. If the judges agree with the student's answer one point is awarded. (Even if the judges are fooled but the correction is noted by the teacher.)
. If the judges rule the answer incorrect the team gets -2 points. (Unless it is correct and so noted by the teacher, then 3 points.)
. Before returning to Team I for their turn (2nd person alphabetically), Team II scrambles their numbers.
. Game continues with students scrambling before each successive turn until one team reaches 25 points.

Suggested Monitoring Procedures

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

Suggested Monitoring Procedures

Possible Resources

Title: Winner Spinner IV
Group Size: entire class
Materials: overhead projector, spinner board transparency, notebook paper, pencil

Procedure(s):

- Each student has a sheet of notebook paper and pencil.
- Ten short lines are drawn on each paper __ __ __ __ __ __ __ __ __ __.
- The object of the game is to create the largest possible number in ten spins.
- The spinner is spun.
- Each student chooses the line on their own paper on which to put the digit. The spinner is spun again. On each spin the students choose where to put the digit.
- After ten spins, the teacher asks one student to read his/her numeral.
- Students with largest numbers are called upon to read their numerals.

Variation:

- To make the game more interesting, divide the transparent spinner board into 12, and mix 3 zeros in with the rest of the digits.

District Resources

Suggested Objective Placement 4-6

Student Learning Objective(s) The student is able to round numbers to the nearest ten, hundred, thousand, million, billion.

State Goal	1
District Goal	
Program Goal	4,7

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title:	Round Off Relay
Group Size:	small group, entire class
Materials:	cards with large numbers written on them, chalkboard and chalk, worksheet

Procedure(s):

- Teacher divides class into two teams.
- The teacher draws a number from the pile of numbers and says "Round to tens, hundredths, etc."
- The first two students from each team race to the board and the first student who rounds the number correctly receives one point for his/her team.
- First team receiving twenty-five points wins.
- Have students complete a worksheet with similar problems.

Suggested Monitoring Procedures

Observation of students in the relay.

Check the worksheet to determine students having difficulty with rounding to tens, hundredths.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
		District Resources

99

100

SUBJECT: **Mathematics**

SPECIFIC AREA: Whole Numbers: Addition

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. addition is the combining of numbers.		K-1					
. an addend is one or a set of numbers to be added. ④+②+③ = 9		1-3					
. a sum is the total of all addends.		1-3					
. that adding zero to a number does not affect the sum.		1-2					
. the addition facts with sums to nine. (mastery)		1-2					
*. the addition facts with sums to 18. (mastery).		2-3					
. that the order in which two numbers are added does not change their sum (commutative property), i.e., 3+5 = 8 or 5+3 = 8.		2-3					
. when adding three or more numbers the way addends are grouped does not affect the sum (associative property), i.e., (1+2) + 4 = 1 + (2+4).		1-3					
. and maintains skills and basic facts of addition taught in primary grades (see Mathematics, Addition K-3).	45	4-8					
The student is able to:							
*. add two two-digit numbers without renaming (carrying), i.e., 21 + 32 = 53.		1-2					
. add three or more one-digit numbers.		1-2					
. add two three-digit numbers without renaming (carrying), i.e., 123 + 234 = 357.		2					
. add three or more two-digit numbers with a sum of less than 100 without renaming (carrying)., i.e., 21+23+14 = 58.		2-3					
*. add any numbers with two or more digits that require renaming (carrying), i.e., 26+48 = 74.		2-3					
. add any three or more two-digit numbers, i.e., 39+65+87+88 = 279.		3-4					
. add any two or more three-digit numbers with renaming.		3-4					
*. add any two or more four-digit numbers with renaming.		3-4					
*. complete any addition problems in either horizontal or vertical form.	45	5-6					
. estimate sums using the concepts of "greater than" and "less than" (140 + 90 > 200 or < 250).	51	5-6					
The student values:							
. the quick and accurate recall of basic facts.	45	4-8					

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ____________

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Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows and maintains skills and basic facts of addition taught in primary grades (see Mathematics, Addition K-3). B. The student is able to complete any addition problems in either horizontal or vertical form. C. The student values the quick and accurate recall of basic facts.

Related Area(s)

State Goal	1,8
District Goal	
Program Goal	2,3,5

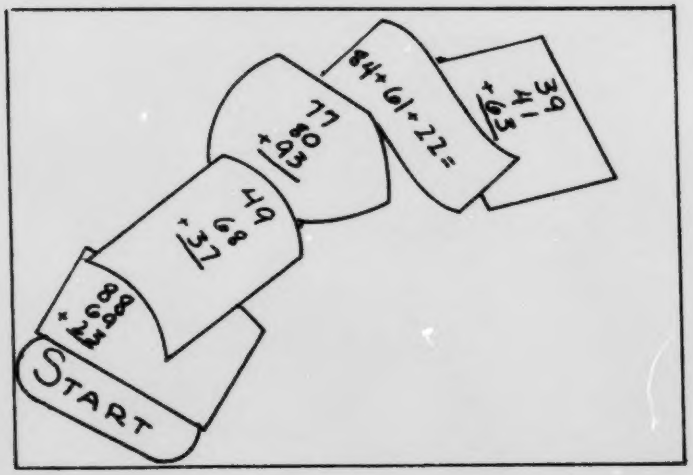
Suggested Activities: Grade(s) 4-6

Title: Patchwork Snake
Group Size: small groups
Materials: fabric, pins, glue, plastic lamination and needles

Procedure(s):

- Have the students sew together scraps of fabric, each about a foot in length, to make a long walk on "Snake."

Example:



- On each section pin or write a problem, (these could be laminated and glued on so the student may write on them).
- To play the game, all players begin at start. A

Suggested Monitoring Procedures

Paper/pencil test.

Observe the student in an activity.

Possible Resources

District adopted text.

District Resources

non-playing official will hold the answer sheet to check the answers.

- Player throws the dice and moves the number of patches indicated.
- The player must work the problem on which he or she lands, and call out the answer.
- If the player does not have the correct answer the player must go back to the starting point.
- The first player to reach the finish is the winner.

Title: Newspaper Idea
Group Size: individual or small group
Materials: newspapers, scissors, paste, pencil and paper

Procedure(s):

- Give students a list of groceries needed for dinner. Have the students locate the advertised price of the items in the newspaper. Then have them cut and paste their grocery list with the prices to a plain sheet of newsprint. Last, have the students total the price of the items listed.

Title: Weigh -In
Group Size: small group
Materials: bathroom scale, paper and pencil

Procedure(s):

- Have the students weigh themselves on the scale and record their weight. Then have the students determine the total weight of the group by adding all the individual weights.

Extension: Have students compare their total group weight to the weight of a car, truck, refrigerator, water bed, etc.. This will force the students to research (ask questions of the experts or read) about the specific items.

District Resources

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows and maintains skills and basic facts of addition taught in primary grades (see Mathematics, Addition K-3). B. The student is able to complete any addition problems in either horizontal or vertical form. C. The student values the quick and accurate recall of basic facts.

Related Area(s)

State Goal 1,8
District Goal
Program Goal 2,3,5

Suggested Activities: Grade(s) 4-6

Title: Football
Group Size: entire class
Materials: overhead projector, transparency with outline of football field (including yard marks, 5 yard intervals), tagboard cut into shape of football, kitchen timer, two construction paper or tagboard cards (one red, one green) stack of cards with number combinations to be summed.

Procedure(s):

- Split class into two groups, line up along walls.
- One group has red card, and other green.
- Red begins first half, green second. Place "ball" on 20-yard line toward red's goal.
- Set timer for six minutes (or any other number).
- Read number combinations (i.e., three plus four).
- Student who has red card must respond quickly and accurately (2-3 seconds). Pass card to the next player in line when he/she answers correctly or incorrectly.
- Advance the "ball" toward red's goal if correct and no penalty (see below).
- When ball crosses goal, 6 points are scored for that team. Keep score on board or overhead.
- Penalties:
  - "Delay of game" — ball moves 5 yards backward.
  - Call next pair of numbers for same students.
  - "Fumble" — wrong answer given. Ball goes over to other team at the place it was fumbled.
  - "Interference" — talking out of turn — 15 yards in favor of non-offending team.

Suggested Monitoring Procedures

Give students basic addition fact combinations. Have students develop a grid chart to keep score on his/her progress.

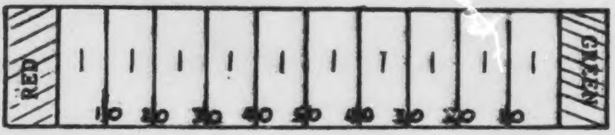
Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

Example:


RED
10
20
30
40
50
40
30
20
10
GREEN

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows and maintains skills and basic facts of addition taught in primary grades (see Mathematics, Addition K-3). B. The student is able to complete any addition problems in either horizontal or vertical form. C. The student values the quick and accurate recall of basic facts.

State Goal	1,8
District Goal	
Program Goal	2,3,5

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Six Digit Relay
Group Size: teams of six
Materials: cards with 6 digits in each number for addends, chalk, chalkboard

Procedure(s):

- The first person on the team writes the problem on the chalkboard then adds the one place digit and records the answer carrying any number necessary to the tens column.
- The second student adds the tens column and records it, carrying if necessary.
- The game proceeds until the problem is solved.
- The first team with the correct answer wins.

Title: Addition Tic-Tac-Toe
Group Size: pairs
Materials: large cardboard, tic-tac-toe board, two boxes of cards (marked: x - problems on back of card, 0 - problems on back of card)

Procedure(s):

- Two students play Tic-Tac-Toe by choosing "X" or "O," picking cards from appropriate boxes and working exercises.
- If answer is correct (the other student checks), the student places his/her card on a square.
- If not, student must wait until next turn.

Suggested Monitoring Procedures

Worksheet of basic addition facts. Group students who have problems with certain combinations and reteach.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

Suggested Monitoring Procedures

Commercial Resources

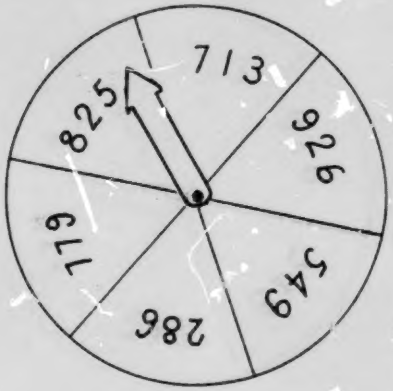
Title: Spin Addend

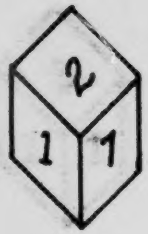
Group Size: pairs, small group

Materials: 1 die marked 2-7, spinner cards (see illustration), spinner, paper and pencil

Procedure(s):

- Players, in turn, roll the die to see how many addends they must spin.
- The spinner is spun the number of times the die indicates, and the players write down the addends.
- The resulting problem is then solved.
- Players check each other's work.
- One point if correct; thirteen wins.





District Resources

Suggested Objective Placement 4-8

Student Learning Objective(s). A. The student knows and maintains skills and basic facts of addition taught in primary grades (see Mathematics, Addition K-3). B. The student is able to estimate sums using the concepts of "greater than" and "less than" (140 + 90 > 200 or < 250).

State Goal	1,8
District Goal	
Program Goal	2,3,5

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Estimating Sums
Group Size: small group or entire class
Materials: chalkboard, worksheet

Procedure(s):

- Explain to students that it is many times advantageous to estimate answers as a way of telling whether a sum is reasonable when the problem is computed.
- Put several examples on the chalkboard and have the entire group work the problems with you, using the terms "greater than" or "less than."
- Give students a worksheet of problems to determine if students have grasped the concept.

Example(s):

$140 + 90 > 200$ or < 250
$387 + 21 > 400$ or < 425
$20 + 899 > 900$ or < 925
$89 + 9 > 95$ or < 100

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) ____

Title: Mental Addition
Group Size: small group or entire class
Materials: chalkboard or worksheet

Procedure(s):

- Discuss when it might be useful to estimate answers through mental addition, i.e., shopping, telling time, traveling.
- Put several problems on the chalkboard and have students mentally add them.

Example:

$$\begin{array}{rrr} 65 & 31 & 28 \\ \underline{20} & \underline{77} & \underline{37} \end{array}$$

- Discuss why some problems are easier than others.
- Write the following problems on the board and suggest two ways of solving them, using mental addition

Example(s):

A. 72 + 16
70 + 10 + 8
80 + 8 = 88

B. 56 + 27
50 + 6 + 20 + 7
70 + 13 = 83

- Give students additional problems to work using either method.

Suggested Monitoring Procedures

Worksheet of addition problems covering all combinations. Check to see which students are having difficulty with specific combinations and reteach.

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Whole Numbers: Subtraction

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. that subtraction is the inverse of addition.		1-3					
. that subtracting zero from a number does not affect the sum.		1					
. the difference is the result of subtracting one quantity from another, i.e., 5 - 3 = ②.		1-2					
. the minuend is the quantity from which another quantity is to be subtracted, i.e., ⑥ - 3 = 3.		1-2					
. the subtrahend is the quantity to be subtracted from another, i.e., 4 - ① = 3.		1-2					
. the subtraction facts with a minuend of five or less. (mastery)		1-2					
. the subtraction facts with a minuend of nine or less. (mastery)		2					
* . the subtraction facts with a minuend of 18 or less. (mastery)		2-3					
. and maintains skills and basic facts of subtraction in primary grades (see Mathematics, Subtraction K-3).	55	4-8					
The student is able to:							
. subtract a one-digit number from a one or two-digit number without renaming (borrowing), i.e., 8 - 2 = 6, 25 - 2 = 23.		1-2					
* . subtract a two-digit number from a two-digit number without renaming (borrowing), i.e., 48 - 26 = 22.		1-2					
. subtract a one-digit number from a two-digit number requiring renaming (borrowing), i.e., 17 - 8 = 9.		2-3					
* . subtract a two-digit number from a two-digit number requiring renaming (borrowing), i.e., 37 - 28 = 9.		3					
. subtract a one-, two- or three-digit number from a three-digit number requiring renaming (borrowing), i.e., 463 - 7 = 456, 463 - 27 = 436 and 463 - 187 = 276.		3					
* . complete any subtraction problem in either horizontal or vertical form.	57	4-6					
. check subtraction problems by addition.	55	4-6					
The student values:							
. the quick and accurate recall of basic subtraction facts.	55	4-6					

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ______________

Suggested Objective Placement 4-8

State Goal	1
District Goal	
Program Goal	1,2,5,6

Student Learning Objective(s) A. The student knows and maintains skills and basic facts of subtraction in primary grades (see Mathematics, Subtraction K-3). B. The student is able to check subtraction problems by addition. C. The student values the quick and accurate recall of basic subtraction facts.

Related Area(s)

Suggested Activities: Grade(s) 4

Title: What's My Rule?
Group Size: small group, entire class
Materials: chalkboard, worksheet

Procedure(s):

- On the chalkboard make two columns with the left side complete with numbers and the right column only one or two numbers.
- Fill in additional numbers and ask students to raise their hand if they know the rule being used.

Examples:

21	14
7	0
49	
86	
14	
8	

The rule is subtract 7 from the left column.

16	29
7	
48	57
21	
63	

The rule is add 9 to the left column.

Suggested Monitoring Procedures

Have students do a worksheet on subtraction and/or addition facts and note problem areas.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) _______

Title: The Inverse
Group Size: entire class, small group
Materials: worksheet

Procedure(s):

- Give students a worksheet with a table with one-half marked addition sentences and the other one-half marked subtraction sentences.
- Complete one or two of the sentences with the class. Have students note that the order in which they add does not affect the sum.
- Point out to students that the addition and subtraction sentences add the inverse of one another and that subtraction can be checked through addition.
- Have the students complete the worksheet.

Example:

Subtraction sentences		Addition Sentences	
15-6=9	15-9=6	6+9=15	9+6=15
14-6=		6+8=14	
10-3=			3+ =10
65-12=			
	19-7=		
	21-5=		

- **Variation:** Have students make up a similar table for the basic addition and subtraction facts, i.e. 7's, 5's, 9's.

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows and maintains skills and basic facts of subtraction in primary grades (see Mathematics, Subtraction K-3). B. The student is able to complete any subtraction problem in either horizontal or vertical form. C. The student is able to check subtraction problems by addition. D. The student values the quick and accurate recall of basic subtraction facts.

Related Area(s)

State Goal	1
District Goal	
Program Goal	1,2,5,6

Suggested Activities: Grade(s) 4-5

Title: Color the Difference

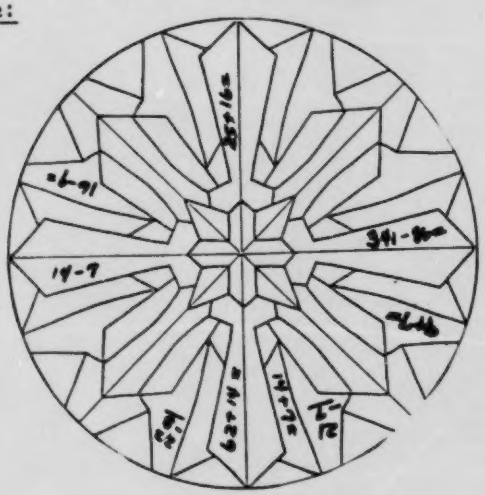
Group Size: entire class

Materials: worksheet, crayons, felt pens

Procedure(s):

- The teacher fills in the spaces with problems for one of the following variations:
- All problems with sums are colored one color and all problems with differences another color. Example: Sums - blue; Differences - yellow.
- The student solves the problems and colors, odd answers orange, even answers magenta.
- The student solves the problem if difference is 0-25, red; 50 -99, purple; 100, black.

Example:



- See following page for full size pattern.

127

Suggested Monitoring Procedures

Pair students having difficulty with more able student for drill.

Possible Resources

District adopted text.

District Resources

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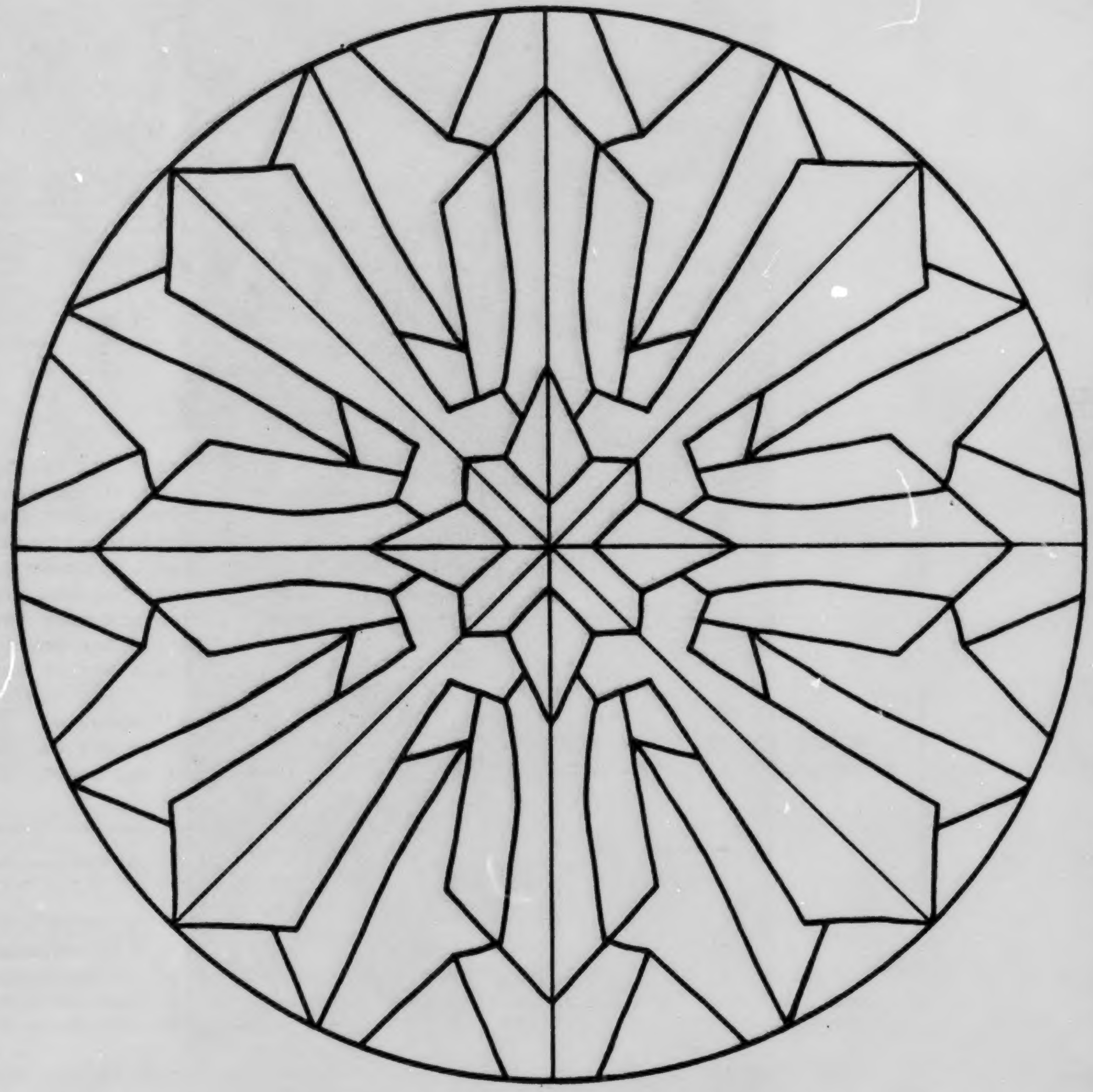

Pattern for Activity Color the Difference

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SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows and maintains skills and basic facts of subtraction in primary grades (see Mathematics, Subtraction K-3). B. The student is able to complete any subtraction problem in either horizontal or vertical form. C. The student is able to check subtraction problems by addition. D. The student values the quick and accurate recall of basic subtraction facts.

Related Area(s)

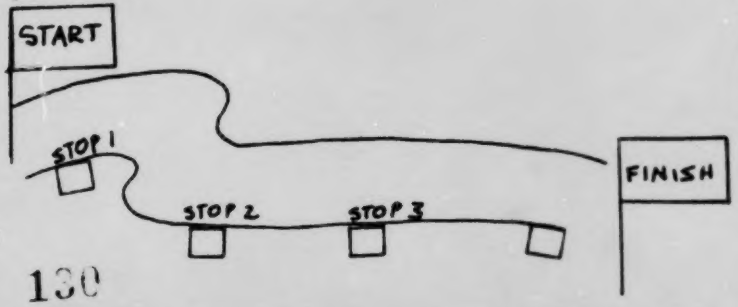
State Goal	1
District Goal	
Program Goal	1,2,5,6

Suggested Activities: Grade(s) 4-6

Title: Subtraction 500
Group Size: individual, pair
Materials: racetrack, worksheets

Procedure(s):

- On a bulletin board or large table make a racetrack with Start, Finish and four pit stops.
- At the start, and at each pit stop, place an envelope with five subtraction problems progressively more difficult at each stop. For example: Start — subtract one digit number from a 3 digit number; Pit Stop #2 — subtract a 2-digit number from a 3 digit number; Pit Stop #2 — subtract a 3-digit number from a 3-digit number.
- Have a set of envelopes for each student playing the game at one time.
- Each student begins with the start problems. When these are correctly solved, the student moves the car to the first pit stop, and so on until he/she has finished the race. The student finishing first wins.
- Choose one student to be official "checker" for each pit stop. Give that student an answer sheet for the problems.



Suggested Monitoring Procedures

Have students complete a worksheet as follows:

11-5=	18+ =24
9-8=	56+ =64
12-9=	6+ =11
24-18=	8+ =9
64-8=	9+ =12

When completed students are to draw a line between comparable subtraction and addition sentences.

Possible Resources

District adopted text, SEAMATH: Seattle Mathematics Program K-6
Seattle Public Schools
815 Fourth North
Seattle, 98109
1975

District Resources

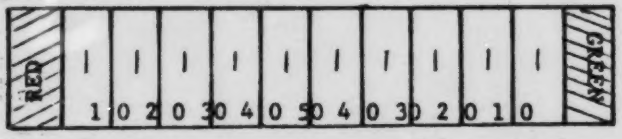
Suggested Activities: Grade(s) 4-6

Title: Six Digit Relay
Group Size: small groups (6 each)
Materials: cards with 6 digits in each number for subtraction, chalk, chalkboard

Procedure(s):
- The first person on the team writes the problem on the chalkboard, then subtracts the one place digits and records the answer.
- The second student subtracts the tens column and records it.
- The game proceeds until the problem is solved.
- The first team with the correct answer wins.

Title: Football
Group Size: entire class (2 teams)
Materials: overhead projector, transparency with outline of football field (including yard marks, 5 yard intervals), tagboard cut into shape of football; kitchen timer, two construction paper or tagboard cards (one red, one green), stack of cards with number combinations to be subtracted.

Procedure(s):
- Draw outline of football field on transparency.
  Example:



- Divide the class into two groups, and have students line up along walls.
- One group has the red card and the other the green card.
- The red team begins the first half, the green team the second. Place "ball" on 50-yard line toward red's goal.

Suggested Monitoring Procedures

Observation by the teacher. Worksheet with subtraction combinations. Re-group students that have similar problems

Give students a worksheet with subtraction problems in vertical and horizontal form. Have them check each answer by use of addition.

Possible Resources

District adopted text.

District adopted text.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows and maintains skills and basic facts of subtraction in primary grades (see Mathematics, Subtraction K-3). B. The student is able to complete any subtraction problem in either horizontal or vertical form. C. The student is able to check subtraction problems by addition. D. The student values the quick and accurate recall of basic subtraction facts.

State Goal	1
District Goal	
Program Goal	1,2,5,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

- Set timer for six minutes (or any other number).
- Read number combination, i.e., seven minus four.
- Student who has red card must respond quickly and accurately (2-3 seconds).
- Advance the "ball" five yards toward red's goal if correct and no penalties (see below).
- When ball crosses goal, 6 points are scored for that team. Keep score on board or overhead.
- Penalties:
  1. "Delay of game" — ball moves 5 yards backward. Call next pair of numbers for same student.
  2. "Fumble" — wrong answer given. Ball goes over to other team at the place it was fumbled.
  3. "Interference" — talking out of turn — 15 yards in favor of non-offending team.
- Student passes the card to the next student in line if he/she answers correctly. If student answers incorrectly, the ball goes to the other team and is placed on their corresponding yard line.

Title: Subtraction Tic-Tac-Toe
Group Size: pairs
Materials: large cardboard tic-tac-toe board, two boxes of cards (marked: X-problems on back of card, 0-problems on back of card)

Procedure(s):

- Two students play Tic-Tac-Toe by choosing "X" or "O" cards from appropriate boxes and working the problems on the card.

Suggested Monitoring Procedures

Give students a quick quiz using a worksheet of basic subtraction combinations and basic addition combinations. Check to see what combinations are causing difficulty. Pair students having difficulty with more able students for flash card drill.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) 4-5

- If answer is correct (the other student checks) the student places his/her card on a square.
- If the answer is incorrect, the student does not get to place card on a square and the other player takes turn.

Title: Test Your Math Muscles
Group Size: small groups
Materials: game board, markers, worksheet, paper, pencils

Procedure(s):

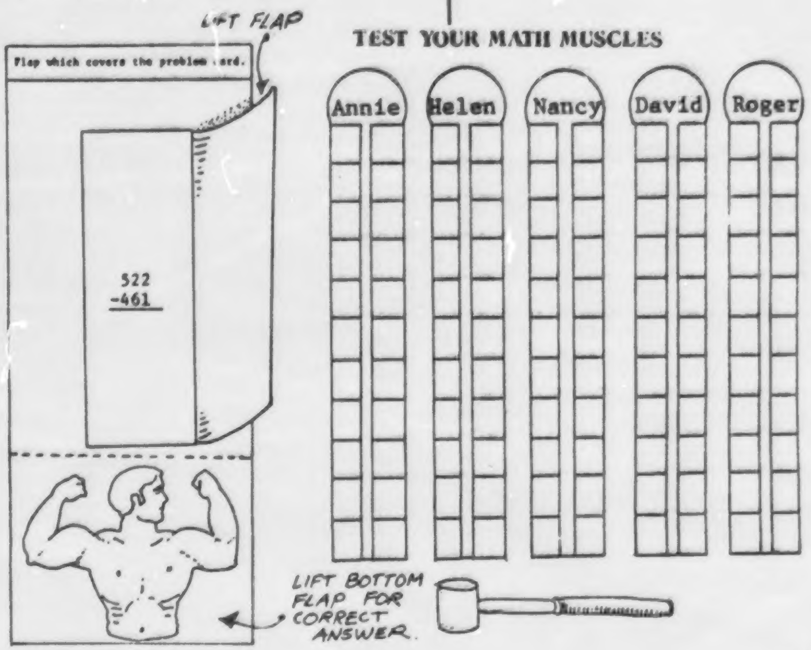
- One student in the small group does not compete with the others. Instead he/she chooses the problem to be worked and inserts it under the problem holder.
- The problem is concealed from the others until the selector says go.
- The other students solve the problem. They may or may not copy the problem.
- As the students finish, they lay down pencils and place their writing hand on the top of their head.
- The player who is sitting out checks the answers.
- The first person who finishes correctly advances one space toward ringing the bell.
- **Variation:** Vary problem difficulty according to grade level and student abilities.

Suggested Monitoring Procedures

Give students a worksheet with subtraction problems in vertical and horizontal form. Have them check using addition.

Possible Resources

District Adopted Text.


LIFT FLAP
Flap which covers the problem card.
522
-461
TEST YOUR MATH MUSCLES
Annie
Helen
Nancy
David
Roger
LIFT BOTTOM FLAP FOR CORRECT ANSWER

SUBJECT: Mathematics

SPECIFIC AREA: Whole Numbers: Multiplication

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8
The student knows:							
. that multiplication can be pictured as the combination of equal sets.		3					
. a factor is one of two or more quantities having a designated product.		3					
. a product results when two numbers are multiplied.		3					
. the product of any number multiplied by the factor of zero is zero (6 x 0 = 0).		3					
. the product of any number multiplied by the factor of one is that number (3 x 1 = 3).		3					
*. the multiplication facts with products through 81 (mastery).	65	3-5					
The student is able to:							
*. multiply one, two and three digit numbers by a one digit number: 4 x 5 = 20 $\begin{array}{r}22\\ \times 5\\ \hline 110\end{array}$ $\begin{array}{r}222\\ \times 5\\ \hline 1110\end{array}$	73	3-5					
*. multiply any number by a two digit number: $\begin{array}{r}126\\ \times 15\\ \hline 630\\ 126\\ \hline 1890\end{array}$ $\begin{array}{r}14\\ \times 12\\ \hline 28\\ 14\\ \hline 268\end{array}$	77	4-5					
*. multiply any number by any three digit number: $\begin{array}{r}626\\ \times 120\\ \hline 12520\\ 626\\ \hline 75120\end{array}$	79	5-6					
. estimate products using concepts of "greater than" and "less than."		4-6					
*. multiply by products of 10 (10's, 100's, 1,000's).	83	4-6					
The student values:							
. the quick and accurate recall of facts.	65	3-8					

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OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ____________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-5

Student Learning Objective(s) A. The student knows the multiplication facts with products through 81 (mastery). B. The student values the quick and accurate recall of facts.

State Goal 1

District Goal

Program Goal 5,8

Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Pinpoint

Group Size: two people or two groups

Materials: 1) game board drawn as shown on bottom of this sheet. 2) 81 tiles with the products 1-81 on them, tagboard, chalkboard

Procedure(s):

- Tiles are placed face down. Each player draws three tiles. Players, in turn, place tile on the board and keep score by the following points: +2 points for tile correctly placed; -5 points for incorrectly placed tile; +1 bonus for placing a tile that touches another tile.
- After playing a tile, draw one from the pile.
- Game ends when all tiles are played.
- Student with the most points is the winner.

Gameboard

1									
2									
3									
4									
5									
6									
7									
8									
9									
X	1	2	3	4	5	6	7	8	9

Tiles

32 72 45

Suggested Monitoring Procedures

Timed tests.

Possible Resources

Math Laboratory at Pacific Science Center

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-5

Student Learning Objective(s) A. The student knows the multiplication facts with products through 81 (mastery). B. The student values the quick and accurate recall of facts.

State Goal 1
District Goal
Program Goal 5,8

Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Basic Facts Solitaire
Group Size: individuals
Materials: deck of cards consisting of multiplication facts

Procedure(s):

- Each deck consists of matching pairs of phrase and answer cards. For example, 2x3 and 6 make a multiplication fact pair. The difficulty of the game depends on 1) the difficulty of the facts, and 2) the number of pairs of phrase and answer cards in the deck. This may vary from 10 to 25 pairs.
- Phrase cards are printed in red and answer cards are printed in black.
- A matching pair consists of a phrase card (red), and answer card (black).
- Player shuffles cards and turns the first two cards face up. If these cards are a matching pair, player then "covers" them by placing the next two cards face up on top of the first two cards.
- If no pair is showing, the player turns up two more cards so that he/she now has four face-up cards showing. Once again, he/she examines them for matching pairs, covering any pairs that are showing as before.
- The play continues with the player turning up two cards at a time whenever no more pairs are showing on the cards that were already turned up.
- When all cards have been played, the player picks up stacks of cards by pairs: he/she picks up each pair of stacks whose top cards form a matching pair. If player has not made a mistake, he/she will be

Suggested Monitoring Procedures

Possible Resources

District adopted text.

District Resources

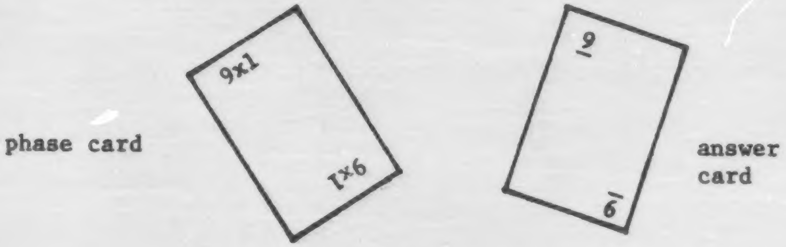
Suggested Activities: Grade(s) _______

able to pick up all of the cards in this manner.

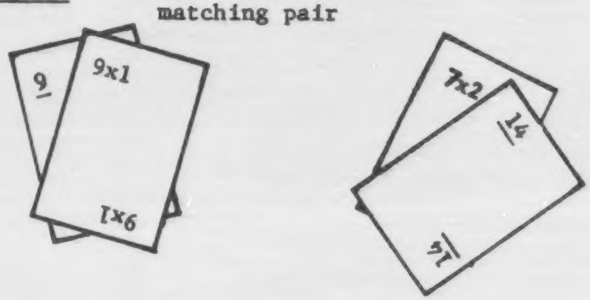
Note:

- The player who recognizes all of the matching pairs as they are turned up will generally need to make fewer stacks of cards than a player who overlooks some of the matching pairs. Two or more players may have a contest to see who needs the fewest stacks to complete the game.

Example:


phase card
9x1
9x1
9
9
answer card

Example:


matching pair
9
9x1
9x1
7x2
14
14

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-5

Student Learning Objective(s) A. The student knows the multiplication facts with products through 81 (mastery). B. The student values the quick and accurate recall of facts.

State Goal	1
District Goal	
Program Goal	5,8

Related Area(s)

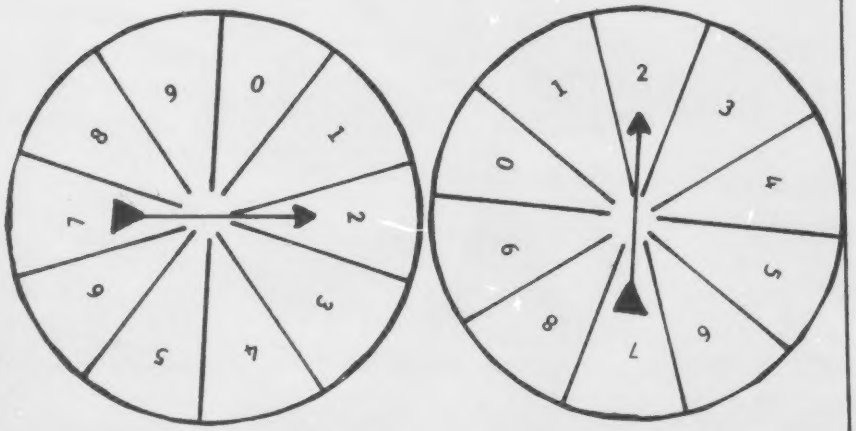
Suggested Activities: Grade(s) 4-5

Title: Spin-a-Fact
Group Size: pairs, small groups
Materials: one game board and two markers per student, two spinners per group

Procedure(s):

- The students spin, in turn, both spinners and multiply the two indicated numbers.
- The student then finds the product on the point award chart (found on back of page) to learn points earned.
- Students keep track of score on tally sheet.
- The winner is the first student to earn 100 points.

Example of spinners: (Game needs two spinners.)



Suggested Monitoring Procedures

Timed fact test.

Possible Resources

Math Laboratory at Pacific Science Center.

District Resources

Suggested Activities: Grade(s) ______

SPIN-A-FACT / MULTIPLICATION

Point Award Chart

You get this number of points	1	5	7	20	10
for					
these products	0	6, 8, 12, 18, 24	4, 9, 16, 36	1, 25 49,64 81	2, 3, 5, 7, 10, 14, 15, 20, 21, 17, 28, 30, 32, 35, 40, 42, 45, 48, 54, 56, 63, 72

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-5

Student Learning Objective(s) A. The student knows the multiplication facts with products through 81 (mastery). B. The student values the quick and accurate recall of facts.

State Goal	1
District Goal	
Program Goal	5,8

Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Multo
Group Size: small group, entire class
Materials: card for each player, markers, master card for teacher (with all possible combinations)

Procedure(s):

Note: 1" graph paper works well for the cards.

- Pass out cards to each student and enough markers to play a game.
- The rules are those of Bingo. The student card has five rows of five squares. The center square is a free square. Each square has the product of two numbers.

Example: 42, product of 6 x 7

- The tables are divided up with the 0's and 1's under "M," 2's and 3's under the "U," the 4's and 5's under the "L," the 6's and 7's under the "T," and the 8's and 9's under the "O."
- The teacher calls out, "under L, 6x7," and so on.

Example :

M	U	L	T	O
1	6	20	42	64
8	9	10	36	81
0	3	Free	49	32
7	4	15	18	9
6	16	12	14	18

Suggested Monitoring Procedures

Note the consistent winners.

Award prizes to winners.

Possible Resources

District Resources

Suggested Activities: Grade(s) ______

Title: Speed Test
Group Size: entire class
Materials: worksheet of 125 problems

Procedure(s):

- Each student receives a sheet with the fact problems.
- The class is started together and timed, five minutes for fourth grade, three minutes for fifth grade.

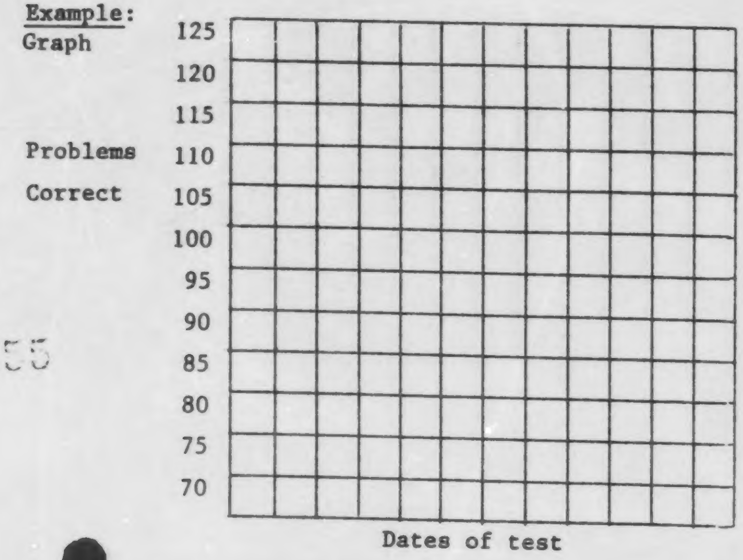
Note: A goal of 85 problems in the specified time would be realistic.

- Each student plots his/her progress from test to test on a graph kept at his/her desk. This activity continues daily or at least often to increase skill and speed.
- When the goal is achieved regularly by a student, he/she may sit out the activity.

Example: (of problems)

$$\begin{array}{ccccccc} 9 & 8 & 3 & 5 & 6 & 3 & 8 \\ \underline{1} & \underline{6} & \underline{2} & \underline{4} & \underline{1} & \underline{3} & \underline{9} \end{array}$$

Example: Graph



Suggested Monitoring Procedures

Check individual papers, record progress.

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-5

State Goal	1
District Goal	
Program Goal	5,8

Student Learning Objective(s) A. The student knows the multiplication facts with products through 81 (mastery). B. The student is able to multiply one, two and three digit numbers by a one digit number: 4x5=20 $\begin{array}{r}22\\ \times 5\\ \hline 110\end{array}$ $\begin{array}{r}222\\ \times 5\\ \hline 1110\end{array}$ C. The student values the quick and accurate recall of facts.

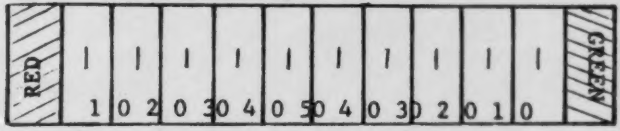
Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Football

Group Size: entire class

Materials: overhead projector, transparency with outline of football field including yard marks, 5 yard intervals, tagboard cut into shape of football, kitchen timer, two construction paper or tagboard cards (one red, one green), stack of cards with number combinations to be multiplied



Procedure(s):

- Split class into two groups, line up along walls.
- One group has red cards and other, green.
- Red begins first half, green second. Place "ball" on 20 yard line, toward goal.
- Set timer for six minutes, or any other number.
- Read number combination (i.e., three times four).
- Student who has red card must respond quickly (two or three seconds) and accurately. Pass card to next in line when he/she answers correctly or incorrectly.
- Advance the "ball" toward red's goal if correct and no penalties (see below).
- When ball crosses goal, six points are scored for that team. Keep score on board or overhead.
- Penalties:
  1. "Delay of game"—ball moves 5 yards backward. Call next pair of numbers for same student.

Suggested Monitoring Procedures

Observation of activity.

Worksheet of multiplication facts given as a timed test.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
2. "Fumble" — wrong answer given. Ball goes over to other team at the place it was fumbled. 3. "Interference" — talking out of turn — 15 yards in favor of non-offending team.		
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-5

Student Learning Objective(s) The student is able to multiply one, two and three digit numbers by a one digit number: 4 x 5 = 20 $\begin{array}{r}22\\ \times 5\\ \hline 110\end{array}$ $\begin{array}{r}222\\ \times 5\\ \hline 1110\end{array}$

State Goal	1
District Goal	
Program Goal	5,8

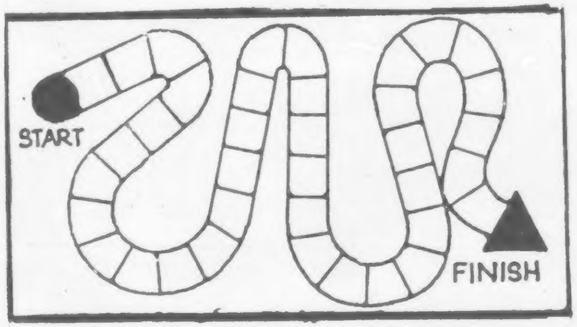
Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Multiplication Game Board
Group Size: pairs
Materials: two markers, one gameboard, 3" x 5" index cards with a problem written on one side, and on the reverse side, point values for problem difficulty (6 to 10 cards for each level)

POINT VALUES:
1 - basic multiplication facts
2 - 1 digit times 2 digit factor
3 - 10 or multiple of ten is one of factors
4 - 1 digit times 3 digit factor
5 - two 2 digit factors

Procedure(s):
- Shuffle cards and stack problem side up.
- Draw card and complete exercise.
- The partner checks the product.
- If correct, add the point value on the back of card.
- The student must land exactly on "Finish" to win the game.



Suggested Monitoring Procedures

Possible Resources

Macmillan Mathematics, Thoburn, et al.
Macmillan Publishing Co., Inc.
1976

District Resources

Suggested Activities: Grade(s) ______

Suggested Monitoring Procedures

Possible Resources

Title: Scramble
Group Size: entire class
Materials: forty sheets of 9" x 12" construction paper (twenty in one color, and twenty in another color), numbered 0-9

Procedure(s):

- Divide the group into two teams.
- Distribute 9" x 12" cards, one color to each team. On teams with ten players, each member will have one card. On teams with fewer players, some players will have two cards. For more than ten to a team, use ten students for first use of the digit, and reserve students for double use of the digit. For example, 1 2 ② 4. If just ten people or fewer students are on a team, use hand sign if the digit is duplicated.
- A problem is called out by the teacher. The team members individually compute the problem. Those members holding a card with a correct digit move to the front of the room to help display the answer.
- The team that correctly orders the answer first earns one point. The team to earn ten points wins the game.

Title: Exercise Cards
Group Size: individual, small groups
Materials: tagboard or 3" x 5" index cards

Procedure(s):

- Make or have students make multiplication exercise cards on cards or tagboard. One one side have one digit multiplication problems without the answer, and the other side have the problem with the answer.
- Students should practice with the cards in free time or at a math center, or with another student.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-5

Student Learning Objective(s) A. The student is able to multiply any number by a two digit number:

126	14
x15	x12
630	28
126	14
1890	268

State Goal	1
District Goal	
Program Goal	5,8

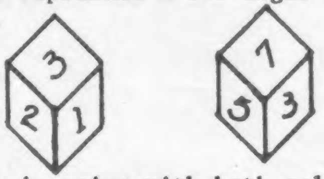
Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Cube It
Group Size: pairs
Materials: number cubes, dice

Procedure(s):

- Each student is given two number cubes of different colors with one representing ones and the other tens. The two cubes represent a two digit number (37 in the example).



- Students work in pairs with both rolling the cubes to get two 2-digit numbers.
- The students then see which one can find the product of the two numbers first.
- The student getting the correct answer first earns points equivalent to the product. The one with the most points after a specified length of time wins.

Title: Multiplication Game Board
Group Size: pairs
Materials: two markers, one gameboard, 3" x 5" index cards with a problem written on one side and on the other reverse side point values for problem difficulty (6 to 10 cards for each level)

1 - basic multiplication facts
2 - 1 digit times 2 digit factor
3 - 10 or multiple of ten is one of factors

Suggested Monitoring Procedures

Observation of activity.

Worksheet of problems with a two digit number as the multiplier.

Possible Resources

District adopted text

Macmillan Mathematics, Thoburn, et al
Macmillan Publishing Company, Inc. 1976

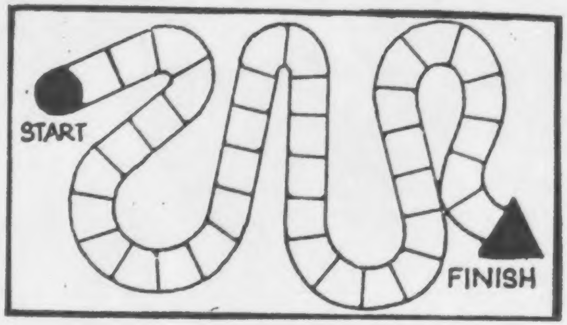
District Resources

Suggested Activities: Grade(s) ______

4 - 1 digit times 3 digit factor
5 - two 2 digit factors
6 - 2 digit times 3 digit factor

Procedure(s):

- Students play game in pairs.
- Draw card and complete exercise.
- The partner checks the product.
- If correct, add the point value on the back of card.
- If incorrect, subtract the point value on the back of the card.
- The student must land exactly on "Finish" to win the game.



Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-6

Student Learning Objective(s) The student is able to multiply any number by any three-digit number:

$$\begin{array}{r}626\\ \times120\\ 12520\\ 626\\ 75120\end{array}$$

Related Area(s)

State Goal	1
District Goal	
Program Goal	5,8

Suggested Activities: Grade(s) 5-6

Title: Touchdown with Multiplication

Group Size: small groups (two to three players)

Materials: football field game board, three footballs with numbers and labeled 1, 2, 3; answer sheet.

Procedure(s):

- Cut out the footballs (see back of page) and place them in a box.
- The first player chooses a football from the box without looking, takes it to the football field.
- There is a number by each yard line. The player multiplies the number on his/her football by the number on the yard line (begin with the 10 yard line).
- A correct answer allows the player to move up a line. if the answer is incorrect, the player goes back to the preceding place. Then it is the next player's turn.
- Play continues until a player reaches the goal to score a touchdown.

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s)	Suggested Monitoring Procedures	Possible Resources

GOAL

90

80 (1. 547)

70

60 (2. 419)

50

40 (3. 632)

30

20

10

Example:

```
      140
      632
      280
     420
    840
    88,480
```

Answers:

1. a.75,580 b. 175,040 c. 425,019. d.360,473 e.382,900
f.186,527 g.134,562 h.502,146 i.344,610
2. a.58,660 b.134,080 c.325,563 d.276,121 e.293,300
f.142,879 g.103,074 h.384,642 i.263,970
3. a.88,480 b.202,240 c.491,064 d.416,488 e.442,400
f.215,512 g.155,472 h.580,176 i.398,160

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-6

Student Learning Objective(s) The student is able to multiply any number by any three digit number:

$$\begin{array}{r} 626 \\ \times 120 \\ \hline 12520 \\ 626 \\ \hline 75120 \end{array}$$

State Goal	1
District Goal	
Program Goal	5,8

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Multiplication Game Board

Group Size: pairs

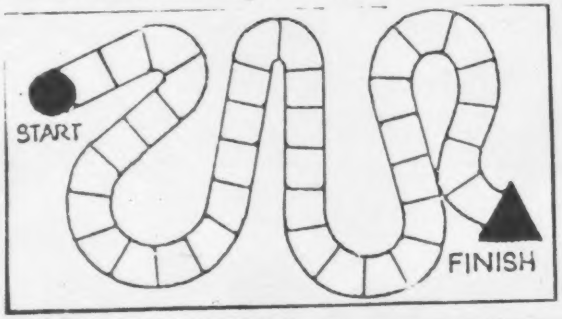
Materials: two markers, one gameboard, 3" x 5" index cards with a problem written on one side and on the reverse side point values for problem difficulty (6 to 10 cards for each level)

point values

1 - basic multiplication facts
2 - 1 digit times 2 digit factor
3 - 10 or multiple of ten is one of factors
4 - 1 digit times 3 digit factor
5 - two 2 digit factors
6 - 2 digit times 3 digit factor
7 - 3 digit times 3 digit factor

Procedure(s):

- Students play game in pairs.
- Shuffle cards and stack problem side up.
- Draw card and complete exercise.
- The partner checks the product.
- If correct, add the point value on the back of card.
- If incorrect, subtract the point value on the back of the card.
- The student must land exactly on "Finish" to win the game.



Suggested Monitoring Procedures

Possible Resources

Macmillan Mathematics, Thoburn, et al
Macmillan Publishing Company, Inc.
1976

District Resources

Suggested Activities: Grade(s) ______

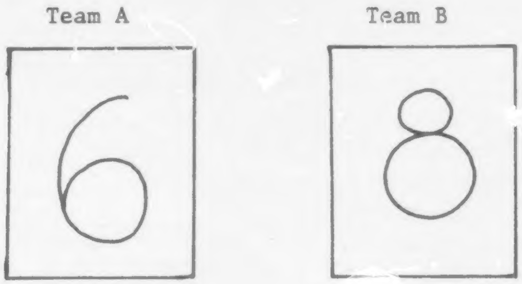
Suggested Monitoring Procedures

Possible Resources

Title: Scramble
Group Size: entire class
Materials: forty sheets of 9" x 12" construction paper (twenty in one color and twenty in another color) numbered 0-9 (example: 0 1 2 3 4 etc.)

Procedure(s):

- Divide the group into two teams.
- Distribute numbered 9" x 12" cards, one color to each team. On teams with ten players, each member will have one card. On teams with fewer players, some players will have two cards. For more than ten to a team, use ten students for first use of the digit and reserve students for double use of the digit. If just ten people or fewer students are on a team, use hand sign if the digit is duplicated, i.e., 1 2 ② 4
- A problem is called out by the teacher. The team members individually compute the problem. Those members holding a card with a correct digit move to the front of the room to help display the answer.
- The team that correctly orders the answer first, earns one point. The team to earn ten points wins the game.



District Resources

Suggested Objective Placement 4-6

Student Learning Objective(s) The student is able to multiply by products of 10 (10's, 100's, 1,000's)

State Goal	1
District Goal	
Program Goal	5,8

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Multiplication Bingo
Group Size: small group, entire class
Materials: blank bingo cards (use 1" graph paper), student markers. two boxes of answers 1-25; 10's, 100's, 1,000's

Procedure(s):

- Student writes numbers 1-25 out of order in squares in blank bingo cards.

Example:

2	14	15	5	16
3	1	4	17	8
19	13	25	7	21
20	18	6	12	22
9	10	11	23	24

- Then one, two or three zeros are added after the numbers in the squares on the bingo cards.

Example:

20	140	1500	50	160
300	10	4000	170	80
1900	1300	250	7000	210
200	180	600	120	2200
900	100	110	230	2400

- The teacher or leader draws a number from the 1-25 box and one from the 10's, 100's, and 1,000's box.
- The student multiplies these two numbers mentally and puts a marker on the number if he/she has it on his/her bingo card.

Note: either regular bingo or blackout may be the game objective.

Suggested Monitoring Procedures

Written problems

Possible Resources

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Whole Numbers: Division

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8
The student knows:							
. that division is the inverse of multiplication.	87	3-4					
. division is repeated subtraction.	87	3-4					
. a dividend is a quantity to be divided.	93	4					
. a divisor is the quantity by which the dividend is to be divided.	93	4					
. the quotient is the quantity resulting from division of one quantity by another.		4					
. the remainder is the dividend minus the product of the divisor and the quotient.		4-5					
* . the basic division facts (mastery).	97	3-5					
The student is able to:							
. divide a one- or two-digit number by a one-digit number without remainders. $\begin{array}{r}3\\2\overline{)6}\end{array}$	87, 101	3-4					
* . divide a one- or two-digit number by a one-digit number with remainder expressed as whole numbers. $\begin{array}{r}2\text{ R1}\\2\overline{)5}\end{array}$	95	4-5					
* . divide two, three-and four-digit numbers by one-or two-digit numbers with remainders expressed as whole numbers.	103	5-6					
* . divide two three-and four digit numbers by one-or two-digit numbers with remainders expressed as a fraction. $\begin{array}{r}23\ 5/8\\18\overline{)419}\end{array}$	107	5-6					
. divide five digits or less by two-or three-digit numbers with or without remainders (expressed in whole numbers, fractions or decimals). $\begin{array}{r}49.2\\5\overline{)246}\end{array}$	109	6-8					
* . solve any given division problem.		7-8					
. check a division problem by using multiplication.	113	4-6					
. estimate the quotient in a given division problem.	113	4-8					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ____________

Suggested Objective Placement 3 - 4

Student Learning Objective(s) A. The student knows that division is the inverse of multiplication. B. The student knows division is repeated subtraction. C. The student is able to divide a one-or two-digit number by a one-digit number without remainders. $\begin{array}{r}3\\2\overline{)6}\end{array}$

State Goal	1
District Goal	
Program Goal	4,5

Related Area(s)

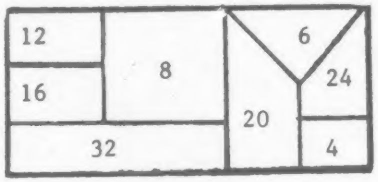
Suggested Activities: Grade(s) 4

Title:
Group Size: small group, entire class
Materials: crayon, paper

Procedure(s):

- . Teacher makes up a puzzle of many different geometric shapes (on a worksheet). Each shape has a product of two numerals written in it, i.e., 3 x 4 = 12; the product would be written in one shape.
- . The teacher would then write a numeral on the chalkboard and state that all numerals on the student's sheet that can be divided by the numeral on the board without a remainder should be colored green.
- . Then repeat process with other divisors and colors written on board.

Example:



Suggested Monitoring Procedures

Observation as activity progresses. Students having problems, refer to smaller group activities.

Possible Resources

Multiplication and Division Sentences (Topic 60), Wisconsin Research and Development Center for Cognitive Learning, Rand McNally, 1975.

District adopted text.

District Resources

Suggested Activities: Grade(s) ____

Title: Division - Objects and Boxes
Group Size: small group, entire class
Materials: 12 objects per student (blocks, paper clips, colored paper, etc.), three boxes for each student.

Procedure(s):

- Pass out materials to each student. Students are to fill each box with an equal number of objects (4 objects) and set boxes side by side.
- Teacher asks the students how many objects they have in total.
- Then how many objects in each box? If you subtract one box, how many boxes are left? How many objects? How many boxes must be subtracted before you have no boxes left?
- Ask the students to develop the sentences:

12 - 3 = 9,
____ - 3 = 6,
____ - 3 = 3,
____ - 3 = 0

- Then have them compare the following sentence with the steps above ____ ÷ 4 = 3.

Variation:

- Give students the number of blocks that would leave a remainder.

Suggested Monitoring Procedures

Teacher notes responses and corrects when necessary.

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-4

Student Learning Objective(s) A. The student knows that division is the inverse of multiplication. B. The student knows division is repeated subtraction. C. The student is able to divide a one- or two-digit number by a one-digit number without remainders. $\begin{array}{r}3\\2\overline{)6}\end{array}$

State Goal	1
District Goal	
Program Goal	4, 5

Related Area(s) ______

Suggested Activities: Grade(s) 4

Title: Division Review
Group Size: small group, entire class
Materials: crayons, paper

Procedure(s):

- Arrange desks in a circle in front of the chalkboard.
- Teacher writes a numeral on the chalkboard.
- On a piece of paper, each student should write the product of any two one-digit numbers he/she wishes.
- All students who are holding a numeral that can be divided by the numeral on the chalkboard without leaving a remainder hold up their numeral. If correct they get a point.
- Students switch papers, either once to the right or once to the left.
- Procedure is repeated.
- When a student reaches five or ten points he/she is the winner.

Title: Blocks and Boxes
Group Size: small group
Materials: 12 blocks for each student, three boxes for each student

Procedure(s):

- Give the students each 12 blocks and three small boxes. The students are to fill the boxes with four blocks in each box. Ask students how to find the number of boxes needed and develop the sentence: ______ x 4 = 12.

Suggested Monitoring Procedures

Observation as activity progresses. Any students with problems refer to small groups and repeat activities.

Paper-pencil test.
Teacher elicits verbal response.

Possible Resources

A One Minute Game Guide
Seymour Metzner, Belmont, CA.
Lear Siegler, Inc., Fearon Publishers, page 30.

District adopted text.

District Resources

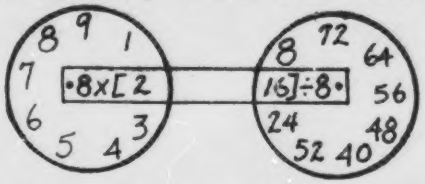
Suggested Activities: Grade(s) ____

- Then explain another way to find the answer. Since we are dividing 12 blocks into groups of four, we can write 12 ÷ 4 = _____. Ask students to find the missing factor in _____ x 4 = 12 and explain that 12 ÷ 4 = 3.

Title: Division Wheel
Group Size: individual, small group
Materials: tagboard, compass, scissors, brass fasteners (pairs)

Procedure(s):

- Make two circles of tagboard and paste them together.
- On the face write the numbers 1 through 9 and on the reverse, write the product of 1 through 9 multiplied by the factor you are working with. Example: Using 8 as the factor, the numbers would be 8, 16, 24, etc.)
- Cut a long strip which will extend around the wheel.
- On the face side write "8 x" and on the reverse side, " ÷ 8 ".
- Cut window in the strip to show the number (see diagram).
- Attach the strip with a brass fastener.



- Each student begins with 25 points. The first student takes a turn by moving the window on the wheel spinner (multiplying) to show a number, i.e., 2. The second student gives the answer (16). A point is lost for an incorrect answer. Turns alternate. The answer to each basic fact will appear in the window on the opposite side of the wheel as shown.
- The game ends when one student has no points left.

Suggested Monitoring Procedures

Possible Resources

Teaching Mathematics in the Elementary School, Lola J. May, New York: The Free Press, The MacMillan Publishing Co., 1970, pages 117-124.

Teaching Elementary School Mathematics for Understanding, pages 126-138.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3 - 4

Student Learning Objective(s) A. The student knows that division is the inverse of multiplication. B. The student knows division is repeated subtraction. C. The student is able to divide a one-or two-digit number by a one-digit number without remainders. $\begin{array}{r}3\\2\overline{)6}\end{array}$

State Goal 1

District Goal

Program Goal 4, 5,

Related Area(s)

Suggested Activities: Grade(s) 4

Title: Concentration

Group Size: 2 - 4 for each set of cards

Materials: set of Concentration cards--sets need not be the same but should be set up as follows:

Procedure(s):

- . Teacher makes sets of 20 to 30 cards.
- . Separate into two equal stacks.
- . Make matching pairs of cards -- one card a multiplication fact (2x6 or 2x6=12) and on the other card the division fact (12 ÷ 6 or 12 ÷ 6 = 2). Be careful not to duplicate facts i.e., do not use the above cards, and cards for 6 x 2 and 12 ÷ 2 in the same set unless students are quite experienced with the concept.
- . Mix cards thoroughly.
- . Place cards in rows, upside down on the playing surface.
- . First player turns over any two cards, laying them down in place. If they match i.e., 2 x 6 and 12 ÷ 6, the player can pick them up. If they do not match, they must be turned over and left in place.
- . The next player turns over any 2 cards of his/her choice. If they match, they are picked up; if not they are turned over again.
- . Players continue until all matching pairs have been picked up.

Suggested Monitoring Procedures

Paper-pencil test as follows: A random list of multiplication facts in the left-hand column--without answers. In the right-hand column, a list of matching division facts in a different order.

Students are to draw lines from each multiplication fact to the matching division fact.

Example:

4 x 6	30 ÷ 5
5 x 2	24 ÷ 8
3 x 8	28 ÷ 7
4 x 7	24 ÷ 6
6 x 5	10 ÷ 2

Record the number correct.

Possible Resources

Teaching Mathematics in the Elementary School, Lola J. May, New York: The Free Press, The McMillan Publishing Co, 1970, pages 117-124.

Teaching Elementary School Mathematics for Understanding, pages 126-138.

District Resources

Suggested Activities: Grade(s) ____	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4

Student Learning Objective(s) A. The student knows a dividend is a quantity to be divided. B. The student knows a divisor is the quantity by which the dividend is to be divided. C. The student knows the quotient is the quantity resulting from division of one quantity by another.

State Goal	1
District Goal	
Program Goal	2,5

Related Area(s)

Suggested Activities: Grade(s) 4

Title:
Group Size: small group, entire class
Materials: paper, pencils and crayons or colored markers

Procedure(s):

- After students have completed a division assignment, the teacher refers to a specific problem and asks the students to circle its divisor in a given color, i.e., red.
- Repeat the procedure for the quotient and dividend of other specified problems with selected colors used to identify the specified terms.

Example:

$$\begin{array}{r} 3 \\ \textcircled{2}\overline{)6} \end{array} \qquad \begin{array}{r} 2 \\ \textcircled{6}\overline{)12} \end{array}$$

Title:
Group Size: entire class
Materials: overhead projector

Procedure(s):

- Have overhead sheets prepared, identifying the divisor, dividend and quotient of a division algorithm or problem.
- Label two terms per problem, and have the students identify the missing term.
- The problems can be written in several forms.

Examples:

$$\begin{array}{rl} 2 & \text{quotient} \\ \underline{\quad 2}\overline{)\ 4} & \text{dividend} \end{array}$$

(dividend) 4 ÷ $\underline{2}$ = 2 (quotient)

Suggested Monitoring Procedures

Teacher observes students work by walking around the classroom.

Teacher elicits verbal responses.

Paper and pencil quizzes.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

198

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Suggested Objective Placement 4-5

Student Learning Objective(s) A. The student knows the remainder is the dividend minus the product of the divisor and the quotient. B. The student is able to divide a one- or two-digit number by a one-digit number with the remainder expressed as whole numbers. $\overset{2R1}{2\overline{)5}}$

State Goal	1
District Goal	
Program Goal	2, 5

Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Recognizing and Understanding Remainders
Group Size: small group, entire class
Materials: paper and pencil

Procedure(s):

. Have the students write on their paper five division problems with single digit divisors and one or two digit dividends with remainder of one. (1)

($3\overline{)7}$)

. Repeat the operation with remainder of two. (2)

($4\overline{)10}$)

. This can be repeated as many times as necessary with different numbers each time.

Title:
Group Size: small group, entire class
Materials: worksheet of the activity, three different colors of crayons (red, green, blue)

Procedure(s):

. Have students work problems on the worksheet first.
. Have the students color the areas green where the division problems have a remainder of one. (1)

Suggested Monitoring Procedures

When the students have written out their problems, have them work the problems to check the proper remainders.

Students having difficulty can receive more instruction about remainders.

Observe the students that are having difficulty and they can be grouped and given more instruction on the concept of remainders and their relationship to the dividend.

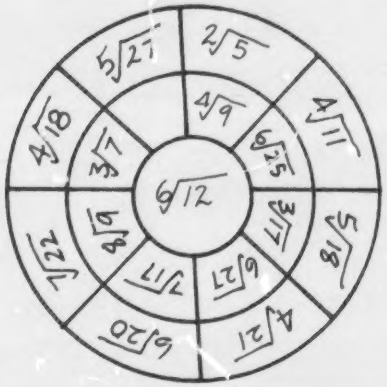
Possible Resources

Multiplication and Division Sentences, Topic 60, Wisconsin Research and Development Center for Cognitive Learning, Rand McNally, 1975.

District Resources

Suggested Activities: Grade(s) ______

- Color the areas red with remainders of two. (2)
- Color the areas blue with remainders of three. (3)


5⟌27
2⟌5
4⟌11
5⟌18
4⟌21
6⟌20
7⟌22
4⟌18
4⟌9
6⟌25
3⟌17
6⟌27
7⟌17
8⟌9
3⟌7
6⟌12

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-5

Student Learning Objective(s) The student knows the basic division facts (mastery).

State Goal	1
District Goal	
Program Goal	5

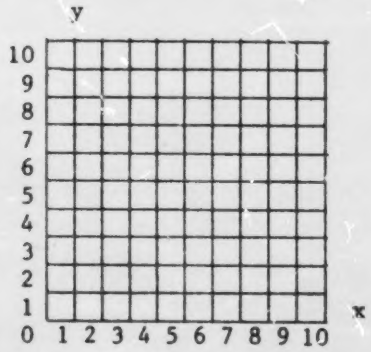
Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Four in a Row
Group Size: small group, entire class
Materials: overhead projector transparency divided into coordinates in numbers 1-10 on each axis, marking pen

Procedure(s):

- . Make up a transparency as follows:



Explain definitions

NOTE: The object of the game is to get 4 points in a row in any direction on the grid.

- . The class is divided into two teams, each member gets a chance to contribute.
- . Every point on the grid has a pair of numbers. For example, the pair of numbers (2,3) refers to the point over 2 on the "x" axis and up 3 on the "y" axis.

Suggested Monitoring Procedures

Observation of students.

Provide additional activities for those students having difficulty with basic division facts.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

- Have the students locate the point he/she wants (that is to make 4 points in a row), decide what the coordinate points are, then think of a division problem that has one of the coordinates as an answer.
- If he/she does the problem correctly, he/she gets to put a point on the grid.
  Example: If the point on the grid is (2,3) then a possible division problem could be 10 ÷ 5 = 2 or 12 ÷ 4 = 3.
- Once the first member of the team gets a point on the grid, the other members need to find points near to the first point in order to get the 4 points in a row needed to win the game.
- The game continues until one team gets 4 points in a row.

Title:	Round the World (Division)
Group Size:	entire class (or small group)
Materials:	list of all division facts (worksheet)

Procedure(s):

- Teacher picks a student to begin and asks the student to stand next to another student's desk.
- The teacher gives them a problem. If the person who is standing gets the correct answer first, he/she goes to the next student. If he/she loses he/she sits in the desk of the winner and the winning student proceeds to the next student.
- Another problem is given and the process is repeated.
  NOTE: Make sure all students get a chance and that each student is ready before the problem is given.
- The student who is able to win the most times is overall winner.

Suggested Monitoring Procedures

As game progresses, students who miss problems constantly can be worked with in small groups.

Also, as the game progresses, problems can be tailored to the abilities of the students to help them be successful.

Possible Resources

District adopted text.

Teaching Mathematics In The Elementary School, Lola J. May, New York: The Free Press, The MacMillan Publishing Co., 1970.

Suggested Objective Placement 3-5

Student Learning Objective(s) The student knows the basic division facts (mastery).

State Goal	1
District Goal	
Program Goal	5

Related Area(s)

Suggested Activities: Grade(s) 4-5

Title:
Group Size: entire class
Materials: worksheet

Procedure(s):

- Give students a worksheet with number sentences and have them complete the table to carry out the division facts.

Example:

n	n ÷ 7
21	3
35	
49	
56	
7	
14	
63	
42	

n	n ÷ 9
36	4
63	
45	
27	
18	
72	
54	
9	

Suggested Monitoring Procedures

Give students a worksheet with division problems. Correct and note problem areas for regrouping and reteaching.

Possible Resources

Mathematics Around Us, Scott, Foresman & Company, 1975.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

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SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-8

State Goal	1
District Goal	
Program Goal	4,5

Student Learning Objective(s) A. The student knows the basic division facts (mastery). B. The student is able to divide a one-or two-digit number by a one-digit number without remainders.

$\begin{array}{r}3\\2\overline{)6}\end{array}$

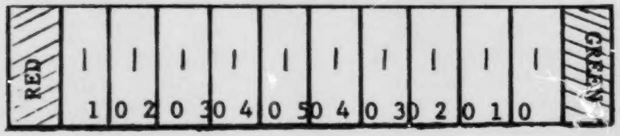
Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Football

Group Size: entire class

Materials: overhead projector, transparency with outline of football fields, including yard intervals, tagboard cut into shapes of football, kitchen timer, two construction paper or tagboard cards (one red, one green), stack of cards with number combinations to be divided.



Procedure(s):

. Split class into two groups, line up along walls.
. One group has red cards and the other green.
. Red begins first half, green second. Place "ball" on 20-yard line toward goal.
. Set timer for six minutes, or any other number.
. Read number combination, i.e., 10 divided by 4.
. Student who has red card must respond quickly (two or three seconds) and accurately. Pass card to next in line when he/she answers correctly or incorrectly.
. Advance the "ball" toward red's goal if correct and no penalty (see below).

Penalties:

"Delay of game" — ball moves 5 yards backward-

Suggested Monitoring Procedures

Give students a worksheet of basic division facts. Have them correct their own from a scoring key. Have them chart their progress until they have mastered the basic division facts.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

call next pair of numbers for same student.
"Fumble" — wrong answer given. Ball goes over to other team at the place it was fumbled.
"Interference" — talking out of turn — 15 yards in favor of non-offending team.

- When ball crosses goal, six points are scored for that team. Keep score on board or overhead.

Title: Magic Squares
Group Size: small group, entire class
Materials: worksheet, chalkboard

Procedure(s):

- Show students a magic square on the chalkboard pointing out that the sum of numbers in each row, column and diagonal is the same.

72	9	54
27	45	63
36	81	18

A

1376	172	1032
516	860	1204
688	1548	344

B

- Have students make a new magic square by dividing each number by 9 in square A. Have them check the new square to see if it is a magic square.
- Have students divide the largest number in square by 8, the next by 7, etc. Have them check to see if the new square is magic by finding the sum.

Suggested Monitoring Procedures

Possible Resources

SEAMATH: Seattle Mathematics Program: K-6, 1974, Seattle School District, 815 Fourth Ave., Seattle, 98109.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-6

Student Learning Objective(s) The student is able to divide two, three and four-digit numbers by one-or two-digit numbers with remainders expressed as whole numbers.

State Goal 1
District Goal
Program Goal 5, 6

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title:
Group Size: small group
Materials: oak tag, felt pens

Procedure(s):

- Make several sets of corresponding cards that show a division algorithm, solved, except for a remainder placed at the top.
- The missing remainder is placed separately on another card. See examples:

$$\begin{array}{r} 6 \\ 5\,\overline{)\,31} \\ \underline{-30} \\ 1 \end{array} \qquad \boxed{\text{R } 1} \qquad \begin{array}{r} 511 \\ 7\,\overline{)\,3579} \\ \underline{-35} \\ 07 \\ \underline{-7} \\ 09 \\ \underline{-7} \\ 2 \end{array} \qquad \boxed{\text{R } 2}$$

- Cards are mixed and students try to match them.

Variations:

- Grouping the cards by the difficulty of the problem, i.e., a) three digit dividends and one digit divisors, b) four digit dividends and two digit divisors, c) etc.
- Make corresponding set of cards, leaving off the answer. Students match the problem card with corresponding answer and or remainder card.

$$\begin{array}{r} 5\,\overline{)\,31} \\ \underline{-30} \\ 1 \end{array} \qquad \boxed{\text{R } 1} \qquad \boxed{6}$$

Suggested Monitoring Procedures

Teacher works with groups and elicits verbal responses and checks student's work.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

Title: MSBD

Group Size: entire class

Materials: chalkboard and chalk or overhead projectors

Procedure(s):

- Print the letters MSBD on the board, spaced about one foot apart. Write the following expression under the letters, with one word of the expression per letter. The expression (or phrase) is:
  McGee Sold Bad Dinners
- Indicate to the students that MSBD refers to the steps necessary in completing a division algorithm (problem).
- Work through some problems on the board or overhead projector, with students using the expression or phrase to identify the various steps in the division algorithm.
- Repeat the expression until there are no numbers to bring down. The algorithm is completed.
- Check the last number subtracted. If the number is greater than zero, identify it as a remainder, and show the students where to place it.

Example:

$$\begin{array}{r} 1 \\ 6\overline{)84} \end{array}$$ D (divide)

$$\begin{array}{r} 1 \\ 6\overline{)84} \\ \underline{6} \end{array}$$ M (multiply)

$$\begin{array}{r} 1 \\ 6\overline{)84} \\ \underline{6} \\ 2 \end{array}$$ S (subtract)

$$\begin{array}{r} 1 \\ 6\overline{)84} \\ \underline{6} \\ 24 \end{array}$$ BD (bring down)

$$\begin{array}{r} 14 \\ 6\overline{)84} \\ \underline{6} \\ 24 \end{array}$$ D (divide)

Suggested Monitoring Procedures

Teacher elicits verbal responses.

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-6

Student Learning Objective(s) The student is able to divide two, three-and four-digit numbers by one-or two-digit numbers with remainders expressed as whole numbers.

State Goal 1

District Goal

Program Goal 5, 6

Related Area(s)

Suggested Activities: Grade(s) 5

Title: Cipher Intrigue

Group Size: entire class

Materials: worksheet of problem(s), one per student

Procedure(s):

- NOTE: This activity is very similar to "secret code."
- Numbers correspond to alphabet letters. That is, a sequence of numbers stands for a letter.
- Students are given a problem (or problems) to solve, whose answer is coded to a letter from the alphabet. The code numbers and corresponding letters are put on the chalkboard or on the worksheet.
- Students solve the problem(s) and work to decode the problems and find the message.

Sample on worksheet:

A = 126.5	Problem 1	810 ÷ 30 = B
B = 27.	Problem 2	506 ÷ 4 = A
C = 32	Problem 3	260 ÷ 7 = D
D = 37.14	Problem 4	

Word is B A D.

Suggested Monitoring Procedures

Give students a worksheet of division problems with two, three- and four-digit numbers with one and two digit divisors. Correct the worksheets and use as a diagnostic tool to group students for reteaching.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ________

Title: Division Relay
Group Size: entire class
Materials: chalkboard

Procedure(s):

- Choose three teams.
- Write three division problems of the same difficulty on the chalkboard.
- The first student in each team writes the quotient.
- The second student multiplies.
- The third student subtracts.
- The fourth student brings down and divides again.
- Repeat until the problem is correctly solved.

NOTE: Any team member can correct a mistake of another team member on his/her turn.

222

Suggested Monitoring Procedures

Possible Resources

SEAMATH: Seattle Mathematics Program K-6, Seattle School District, 1975, 815 Fourth North, Seattle, 98109

District Resources

223

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-6

Student Learning Objective(s) The student is able to divide two, three-and four-digit numbers by one or two digit numbers with remainders expressed as fraction.

```
   23 R5/8
18/ 419
```

State Goal	1
District Goal	
Program Goal	5, 6

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Remainders as Fractions
Group Size: small group, entire class
Materials: paper, pencil, (see activity for dividing two, three, four-digit numbers with a divisor of one or two)

Procedure(s):

- Reinforce method of division used when learning division by two, three-and four-digits, by one or two number divisors, writing remainders as whole numbers.
- Point out that instead of writing R-2 that the remainder can be written as a fraction with the remainder over the divisor. i.e.,

```
    23 R6/21
21/ 489
    42
     69
     63
      6
```

Title: Remainders As Fractions
Group Size: small group
Materials: tagboard with division problems on them, tagboard cards with remainders written as fractions

Procedure(s):

- Either have the entire division problem worked out on the tagboard, except the remainders, or have the problem not completed at all written on the tagboard.

Suggested Monitoring Procedures

As students are working at their assignments the teacher can monitor their ability to write the remainder as fractions.

Students who seem to be low in points could be worked with in small groups later.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
. Have the remainders written as fractions written on separate pieces of tagboard, or have the whole answer written on the separate tagboard sheet. . Each student has all the answers on pieces of tagboard. . Put problem on chalkboard. . Have the students raise their cards (all at the same time). Those with the correct answer scores one point. . The first student to ten wins and can be the problem selector.		
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6 - 8

Student Learning Objective(s) The student is able to divide five digits or less by two or three digit numbers with or without remainders (expressed in whole numbers, fractions or decimals).

49.2
5/ 246

State Goal	1
District Goal	
Program Goal	5,6

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Remainder Multiple Choice
Group Size: small group, entire class
Materials: paper, pencil, worksheets

Procedure(s):

- Circle the problem that has the correct decimal remainder. Work out the problem if needed.

27.5 6/ 165	27.7 6/165	25.5 6/ 165
12.3 10/ 123	12.4 10/ 123	12.6 10/ 123
12.2 12/ 150	12.8 12/ 150	12.5 12/ 150

Title:
Group Size: entire class, small group
Materials: chalkboards, erasers, chalk

Procedure(s):

- Divide the class into groups or teams composed of four members each.
- Each team member becomes a specialist in the division algorithm as follows:
  one does the dividing,
  one does the multiplying,
  one does the subtracting,
  one does the bringing down

Suggested Monitoring Procedures

Check their progress and insist that the students who miss problems work them out in full in order to see where the mistake was made.

Teacher watches proceedings and supervises, referees, etc.

Possible Resources

District adopted text.

SEAMATH: Seattle Mathematics Program K-6, 1975, Seattle School District, 815 Fourth North, Seattle, 98109.

Suggested Activities: Grade(s) ______

- Give all student groups the same problem with the "DIVIDING" specialist copying the problem on the board. At the teacher's signal, the team relay begins.
- The DIVISION specialist divides the divisor into the appropriate number or numbers.
- Then, the MULTIPLYING specialist multiplies the first digit of the quotient times the divisor.
- Next, the SUBTRACTING person subtracts followed by the BRINGING DOWN expert (that's right, BRING DOWN) bringing down the next number from the dividend.
- The procedure is repeated until the problem is solved. The last team member, the SUBTRACTING person, puts up the remainder as specified (R form, decimal, fraction, whatever).

Title:
Group Size: two persons per time
Materials: math division problems written on worksheets and coded by degree of difficulty via color of paper, ink, etc.

Procedure(s):

- Students are randomly grouped by two's.
- Students draw problems from a container (container has problems with the same degree of difficulty, i.e., $x\overline{)xxx}$ or $xx\overline{)xxx}$ etc.).
- Students work problems.
- The first student to complete problem correctly advances to the next round.
- Progress can be kept on a tournament type bulletin board.

Example on following page.

Suggested Monitoring Procedures

Teacher supervises student work, judges if answers are correct, who advances to the next round, etc.

Possible Resources

District adopted text.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

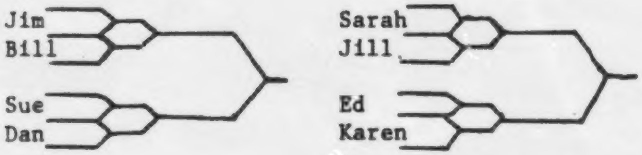
Student Learning Objective(s) The student is able to divide five-digits or less by two or three digit-numbers with or without remainders (expressed in whole numbers, fractions or decimals).

$$\begin{array}{r} 49.2 \\ 5\overline{)246} \end{array}$$

State Goal	1
District Goal	
Program Goal	5,6

Related Area(s)

Suggested Activities: Grade(s) 6	Suggested Monitoring Procedures	Possible Resources



Variations:

- Round winners can be determined other than first student to correctly complete problem. For instance, the two players could solve problems until one person misses. Then the winner would advance and the student who missed could go to a loser's bracket.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4 - 8

Student Learning Objective(s) A. The student is able to check a division problem by using multiplication. B. The student is able to estimate the quotient in a given division problem.

State Goal	1
District Goal	
Program Goal	2,5,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title:
Group Size: small group, entire class
Materials: worksheet

Procedure(s):

- Underline all the sentences equivalent to the one at the top of the box.

S ÷ T = R	120 = 40 x 3
R x T = S	120 ÷ 3 = 40
S x R = T	40 ÷ 3 = 120
R = S x R	3 = 120 ÷ 40

- Many more examples of these can be made up on worksheets and used in this activity.

Title: Crossword Fun
Group Size: small groups
Materials: worksheet crossword

Procedure(s):

- Give students a crossword worksheet(s) using multiplication and division problems.
- Have students make up additional crossword problems and exchange them with partners.
  Example: (On back).

Suggested Monitoring Procedures

Give students a worksheet with division problems with the added stipulation they must be checked using multiplication.

Possible Resources

SEAMATH: Seattle Mathematics Program K-6, 1974, Seattle Public Schools, 815 Fourth Avenue, Seattle, 98109.

District Resources

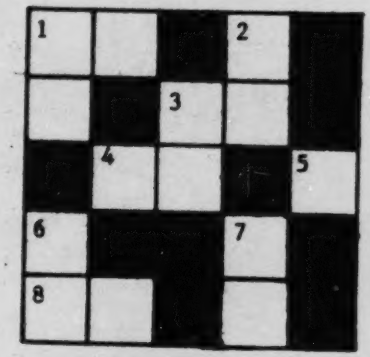
Suggested Activities: Grade(s) ______

Across

1. 3×7
2. $7\overline{)21}$
3. 4×4
4. 7×6
5. $4\overline{)12}$
6. $6\overline{)42}$
7. $9\overline{)36}$
8. 8×7

Down

1. 8×3
2. 4×9
3. 4×3
4. $3\overline{)12}$
5. $8\overline{)24}$
6. 8×6



Title: Division Double Check
Group Size: small group, entire class
Materials: pencil, paper, worksheet

Procedure(s):

- Follow the directions in each box.

R x T = Y	32 = 4 x 8
Write an equivalent division sentence	Write an equivalent division sentence.
42 ÷ 7 =	150 ÷ 6 = 25
Write an equivalent multiplication sentence.	Write an equivalent multiplication sentence.

- Many more examples of these can be written up and incorporated in the activity.

Suggested Monitoring Procedures

Follow their progress to see which students have not grasped this concept as yet.

They can be given more specific drill concerned with checking division problems by multiplication.

Possible Resources

District adopted text.

SEAMATH: Seattle Mathematics Program: K-6, 1974, Seattle Public Schools, 815 Fourth Ave., Seattle, 98109

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student is able to check a division problem by using multiplication. B. The student is able to estimate the quotient in a given division problem.

State Goal	1
District Goal	
Program Goal	2,5,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Chart Division
Group Size: small group, entire class
Materials: worksheet

Procedure(s):

- Give students a multiplication chart and indicate to them they can find division answers by noting where two numbers cross.

X	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	48	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81

- Have students locate 6 on the side of the chart.
- Have students move their finger across the row until they find 30.

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) ______

- Have students use the number at the top to complete the following division fact:

$$\begin{array}{r}5\\6\overline{)30}\end{array}$$

- Have students complete the worksheet of division problems using the division chart.
  Examples:

$9\overline{)63}$ $7\overline{)49}$ $4\overline{)36}$

$8\overline{)72}$ $6\overline{)48}$

Suggested Monitoring Procedures

Possible Resources

District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Whole Numbers: Story Problems

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8
The student knows:							
. characteristics of a number sentence are operational sign(s) and an equal sign.	119	2-8					
. basic facts.	121	3-5					
. that - and + are inverse operations.	125	3-4					
. that X and ÷ are inverse operations.	125	4-5					
. that not all information given in a story problem may be relevant to the solution of the problem.	127	2-8					
. clue words (total, sum, more, product, remainder, average, quotient).	133	3-5					
The student is able to:							
. project a mental image (draw a picture) of the problem from an appropriate story problem.	127	2-8					
. identify relevant information necessary for solution.	129	2-8					
. identify operation to achieve solution (+, -, X, ÷).	125	4-6					
. estimate size of problem solution (><).	131	4-8					
. solve story problems with one operation.	121	2-3					
. solve story problems with multiple operations.	121	4-8					
. develop (write) a story problem from a given number sentence and solve the problem.		4-8					
. translate word sentences into "number" sentences.	119	4-6					
. translate equations to solvable form: $\boxed{10} - 3 = 7$ to $\boxed{10} = 7+3$.	119	5-8					
The student values:							
. analysis and solution of story problems as the ultimate goal of mathematics.	121	2-8					

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ____________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 2-8

Student Learning Objective(s) A. The student knows characteristics of a number sentence are operational sign(s) and an equal sign. B. The student is able to translate word sentences into "number" sentences. C. The student is able to translate equations to solvable form: 10 - 3 = 7 10 = 7 + 3.

State Goal	1
District Goal	
Program Goal	2,6,8

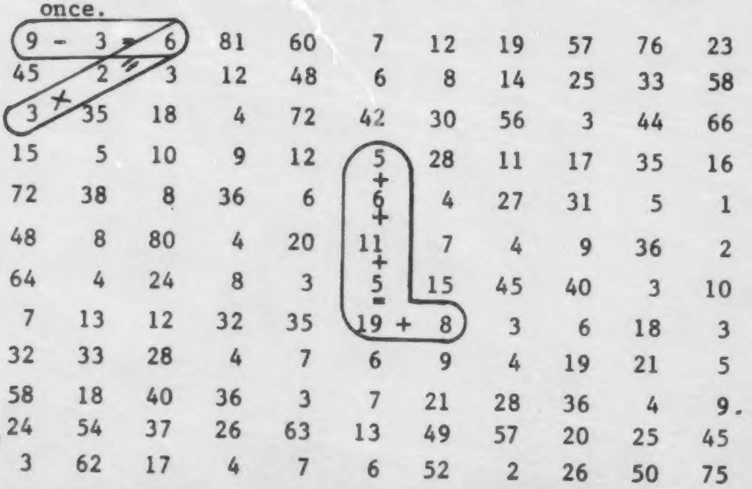
Related Area(s)

Suggested Activities: Grade(s) 4-6	Suggested Monitoring Procedures	Possible Resources

Title: Mathematatrix
Group Size: small group, entire class
Materials: worksheet, overhead transparency or chalkboard

Procedure(s):

- On the chalkboard or overhead, list several numbers in rows.
- Use symbols between the numbers to make math sentences (+, -, ÷, x, =).
- Put loops around math sentences.
- Scoring:
  - Number sentences containing 3 numbers - 3 points
  - Number sentences containing 4 numbers - 5 points
  - Number sentences containing 5 or more numbers -10 points
- Give students a worksheet like the following:
- Loops have been drawn for three number sentences. Notice that the same number can be used more than once.



9 -	3 =	6	81	60	7	12	19	57	76	23
45	2 =	3	12	48	6	8	14	25	33	58
3 x	35	18	4	72	42	30	56	3	44	66
15	5	10	9	12	5 +	28	11	17	35	16
72	38	8	36	6	6 +	4	27	31	5	1
48	8	80	4	20	11 +	7	4	9	36	2
64	4	24	8	3	5 =	15	45	40	3	10
7	13	12	32	35	19 +	8	3	6	18	3
32	33	28	4	7	6	9	4	19	21	5
58	18	40	36	3	7	21	28	36	4	9.
24	54	37	26	63	13	49	57	20	25	45
3	62	17	4	7	6	52	2	26	50	75

District Resources

Suggested Activities: Grade(s) ______

Title: A Picture is Worth a Thousand Numbers

Group Size: pairs, entire class

Materials: picture(s) from magazine or drawing on board or overhead projector (picture of a crowd of people) number sentence on board or overhead (35 - 7 = A), pencil and paper for each student

Procedure(s):

- Direct the students to write a story problem related to the picture using the number sentence for solution.
- Exchange papers and solve. Read to class.

Variation:

- Do not furnish number sentence. Students make up their own.

Suggested Monitoring Procedures

Teacher observation.

Give students a worksheet with problems and their solutions. Have them put in the operational signs to make the sentence true.

Example:

1. 6 ☐ 4 ☐ 24
2. 7 ☐ 6 ☐ 1
3. 18 ☐ 24 ☐ 42
4. 120 ☐ 40 ☐ 3

Possible Resources

District adopted text

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 2-8

Student Learning Objective(s) A. The student knows basic facts. B. The student is able to solve story problems with one operation. C. The student is able to solve story problems with multiple operations. D. The student values analysis and solution of story problems as the ultimate goal of mathematics.

Related Area(s)

State Goal	1
District Goal	
Program Goal	3,6,8

Suggested Activities: Grade(s) 4-6

Title: Shopping Spree
Group Size: individual, entire class
Materials: newspaper, pencil and paper, calculator (optional), ribbons or badges

Procedure(s):

- Teacher sets a maximum amount to be spent on shopping spree, i.e., $10 or $20 or other reasonable maximum.
- Using the supermarket advertisements, student "shops" at one market only, selecting food items from each of the basic food groups (dairy, meat, cereal grains, fruit and vegetables).
- Student records item(s) selected and price.
- Student totals purchases, and must return some items if he/she exceeds pre-set maximum.
- Student (or teacher) checks total on calculator.
- Reward with badges or ribbons proclaiming balanced choices from food groups and staying within the budget.

Title: Mail Order Math
Group Size: individual, entire class
Materials: catalogues or supplements, facsimile of order form (see sample), calculator (optional)

Procedure(s):

- Have each student select a topic, i.e., shop, kitchen, bedroom, clothing, etc., or draw lots from prepared slips of paper with one topic on each.
- Each student completes order sheet ordering three (or more) items i.e., clothing: 1 shirt, 1 pair

Suggested Monitoring Procedures

Teacher observation and assistance.

Possible Resources

District Resources

Suggested Activities: Grade(s) ______

pants, 1 pair shoes.

- Each students totals the amount of the order.
- Student checks the total on the calculator.

Variation(s): (For upper grades)

- Multiple items (three sheets @ $2.65, etc.) may be selected to utilize multiplication.
- Sales tax may be added. (Calculate or use tax tables)
- Shipping charges, or parcel post charges may be calculated.

Example of Order Form:

FERNDOC MAIL ORDER, INC.
1234 1st Street.
Ferndoc, Ohio 54321

Ship to: Name______________________
Address______________________
City________ State__________ Zip________

Catalogue Number	Description of Item	Number of Items	Cost per Item	Total Cost

Other Options

Sub Total ______
Sales Tax ______
Shipping Fee ______
GRAND TOTAL ______

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 2-8

Student Learning Objective(s) A. The student knows basic facts. B. The student is able to solve story problems with one operation. C. The student is able to solve story problems with multiple operations. D. The student values analysis and solution of story problems as the ultimate goal of mathematics.

State Goal	1
District Goal	
Program Goal	3,6,8

Related Area(s)

Suggested Activities: Grade(s) 4-6

Suggested Monitoring Procedures

Title: Puzzle
Group Size: pairs
Materials: paper, pencil

Procedure(s):

- Tell your partner to do the following things:
  - Write down his/her age in years. (Let us suppose the person is 13 years old). 13
  - Multiply by 2. x2 = 26
  - Subtract 3 from this product. -3 = 23
  - Multiply the answer by 50. x50 = 1150
  - Add 39 to the last product. +39 = 1189
  - Add the amount of change the partner has in his/her pocket. The amount must be less than one dollar. (Let us suppose the person has 37¢ in change.) +37 = 1226
  - Have the partner tell you his/her answer, and you will tell him/her how old they are, and how much change they have.
  - Add 111 to the answer. The first two figures will be the person's age, and the last two figures will be the amount of change.

$$\begin{array}{r} 1226 \\ +111 \\ \hline \underbrace{13}_{\text{age}}\underbrace{37}_{\text{change}} \end{array}$$

Possible Resources

SEAMATH: Seattle Mathematics Program: K-6, 1975
Seattle Public Schools
815 Fourth North
Seattle, WA 98109

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows that - and + are inverse operations. B. The student knows that X and ÷ are inverse operations. C. The student is able to identify operation to achieve solution (+, -, x, ÷).

State Goal	1
District Goal	
Program Goal	2,3,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Strategy For Identifying Operation (X, -, X, ÷) to Solve Story Problems

Group Size: individual, entire class

Materials: many story problems

Procedure(s):

- The following story problems are given to illustrate the strategy:
  - A. There are seven cookies on one plate and 12 cookies on another plate. How many cookies are there?
  - B. My book has 68 pages. I have read 16 pages. How many pages are left to read?
  - C. There are five jars of flies. Each jar contains 23 flies. How many flies are there?
  - D. A bag contains 63 pieces of candy. Seven kids will get the same amount of candy. How much candy will each kid get?
- Student reads the problem and decides: does the question ask for a greater or lesser amount than the number given in the problem? (This is a gross estimate.)

  Problem A - the question asks for a greater amount than the number given.

  Problem B - a lesser amount is asked for.

  Problem C - a greater amount is asked for.

  Problem D - a lesser amount is asked for.
- Student must decide if the numbers given in the problem represent sets of equal amounts of things or sets of unequal amounts of things.

Suggested Monitoring Procedures

Possible Resources

District adopted text

Sample text

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources

Problem A - the plates contain ≠ amounts of cookies.
Problem B - 68 pages and 16 are ≠ amounts.
Problem C - each jar contains the same amount of flies, therefore the sets are equal.
Problem D - 7 kids get the same amount, therefore the sets are equal.

- Student already knows that:
  greater amounts of = sets are obtained by X
  greater amounts of ≠ sets are obtained by +
  lesser amounts of = sets are obtained by ÷
  lesser amounts of ≠ sets are obtained by -
- After determining greater or lesser and equal or unequal for each problem, only one process (+, -, x, ÷) will fit the problem.
- After explaining the above strategy to the students, read story problems orally to the students. Each student determines > or <, = or ≠, + or -, or x or ÷ on paper.
- Student uses this procedure with story problems and writes his/her decisions of each step to each problem.

NOTE: See K-3 Mathematics Curriculum, p 139 - Subtract and Add - Inverse operations, p 178 - Multiplication and Division - Inverse operations.

District Resources

Suggested Objective Placement 2-8

Student Learning Objective(s) A. The student knows not all information given in a story problem may be relevant to the solution of the problem. B. The student is able to project a mental image (draw a picture) of the problem from an appropriate story problem.

State Goal	1
District Goal	
Program Goal	1,2,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title:	Math Art
Group Size:	individual, entire class
Materials:	drawing paper, crayons or colored pencils, paint or chalk

Procedure(s):

- Teacher writes a descriptive story problem or problems on the chalkboard, i.e., "Three grebbletoffs came tumbling and swinging down the hall. One fell in the laundry chute, and didn't get out at all. Who made it where?"
- The student uses the art materials to illustrate the problem he/she selectes.
- Finished illustrations may then be put up on the bulletin board.

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources
205		206

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 2-8

Student Learning Objective(s) A. The student knows that not all information given in a story problem may be relevant to the solution of the problem. B. The student is able to identify relevant information necessary for solution.

State Goal	1
District Goal	
Program Goal	6,7

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: What's Important?
Group Size: small group, entire class
Materials: set of cards with a story problem on each containing one or more items of unnecessary information (An empty elevator stopped on the first floor and picked up twelve people. It stopped on the second floor, four people got off and seven got on. How many stops did the elevator make?). A second set of cards with identical details but question requires formerly irrelevant information (How many people were on the elevator at the next stop?).

Procedure(s):

- Call on any student to describe the irrelevant information in his/her problem. Others check theirs to see if they hold the card where that information is relevant.
- Students with matching cards get together and solve problems.

Suggested Monitoring Procedures

Oral and written responses for teacher.

Possible Resources

District adopted text

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

269

270

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 2-8

Student Learning Objective(s) A. The student knows not all information given in a story problem may be relevant to the solution of the problem. B. The student is able to estimate size of problem solution (> <).

State Goal	1
District Goal	
Program Goal	6,7

Related Area(s)

Suggested Activities: Grade(s) 4-6	Suggested Monitoring Procedures	Possible Resources

Title: Mystery Stories
Group Size: small group, entire class
Materials: paper, pencil, math texts

Procedure(s):

- Discuss with students some of their favorite TV mystery programs or stories they have read. Ask them how they solve the mystery (the tying together of clues).
- Suggest a mystery using numbers such as the following:

Clue 1: Bill picked a certain number and added 5 to it.
Clue 2: Sally picked a different number and added 5 to it.
Clue 3: Bill's answer was greater than Sally's answer.
Mystery: Who started with the greater number? Why?

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

Suggested Objective Placement 3-6

Student Learning Objective(s) A. The student knows clue words (total, sum, more, product, remainder, average, quotient). B. The student is able to identify operation to achieve solution (+, -, X, ÷).

State Goal	1
District Goal	
Program Goal	2,6,8

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Find The Solution
Group Size: entire class
Materials: overhead projector, worksheet

Procedure(s):

- Write out a couple of short story problems on a transparency.
- Read the problem with the entire class. Ask them if they recognize any words that would indicate what operation they should use to solve the problem, i.e., total or "sum" for addition, "Less than," or "how much less" or "remainder" for subtraction, etc.
- Circle the clue word and place the sign for the operation by the clue word.
- Hand out a worksheet with story problems. Students are to circle the clue word and place the operation sign by the clue word.
- Have students solve the problem.

Example:

Mary went to the Ice Follies and paid $3.85 for her ticket. How much did she have left from a $5.00 bill?
Answer: $5.00 - $3.85 = $1.15.
Bill went to see the Seattle Mariners play baseball at the Kingdome. His bleacher seat cost $2.65, and he had a hot dog that cost 65 cents, and a drink that cost 35 cents. How much was the total that he paid?
Answer: $2.65 + .65 + .35 = $3.65.

Suggested Monitoring Procedures

Group students who have problems in identifying the clue words and/or the solution operation signs for additional help.

Possible Resources

District adopted text

District Resources

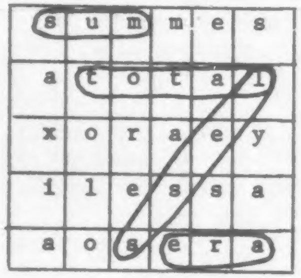
Suggested Activities: Grade(s) ______

Title: Hidden Word Puzzle
Group Size: individual, entire class
Materials: worksheet of puzzle, pencil per student
Note: puzzle is a grid with math clue words written horizontally, vertically or diagonally, one letter per square (see example).

Procedure(s):

. Student circles each word he/she finds.
Example:

difference
total
all together
product
quotient
average
more
less
sum
times
of
is
are



s	u	m	m	e	s
a	t	o	t	a	l
x	o	r	a	e	y
i	l	e	s	s	a
a	o	s	e	r	a

Suggested Monitoring Procedures

Teacher observation.

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-8

Student Learning Objective(s) A. The student knows clue words (total, sum, more, product, remainder, average, quotient). B. The student is able to translate equations to solvable form: $\boxed{10} - 3 = 7$ to $\boxed{10} = 7 + 3$.

State Goal	1
District Goal	
Program Goal	2,6,8

Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Total Line Up

Group Size: entire class (some participate, some observe, one acts as a leader)

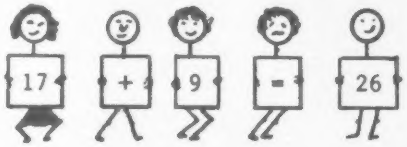
Materials: large cards (8" x 10"): some with a process sign (+, -, x,), an equal sign, and numbers (the numbers must be those that will work together in an accurate number sentence)

Procedure(s):

. Each participant selects a card.

. Leader directs the group to make a correct number sentence. (Other participants have appropriate sign cards to make the number sentence correct.)

Example:



. One of the addends then turns over to form an unknown ☐.

. Leader directs participants to regroup to put the number sentence in solvable form.

Suggested Monitoring Procedures

Observation by the teacher and grouping of students who have difficulty with the activity.

Possible Resources

Adopted district text

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Rational Numbers: Fractions

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. any integer can be expressed as a fraction.	139	5-7					
. a fraction consists of a numerator (which is on top) and a denominator (which is on the bottom) with the line between as a symbol which means divide.	139	5-7					
. proper fractions have numerators which are less than the denominator.	149	5-7					
. improper fractions have numerators greater than or equal to the denominator.	149	5-7					
. mixed numbers (forms) consist of a whole number added to a a proper fraction.	151	5-7					
The student is able to:							
. identify and write fractions to represent parts of a region.		4-5					
. write a fraction for part of a set.	143	5-6					
. identify and write fractions to represent an incompleted division of two numbers.	141	5-7					
. find fractions that are equivalent to given fractions.	145	5-7					
. order fractions with like denominators.	147	5-7					
. order fractions with unlike denominators.	157	5-7					
. locate a fractional number on a number line.	161	5-6					
*. change fractions to simplest forms.	159	5-7					
. change mixed forms to improper fractions.	151	5-7					
*. add and subtract fractions with like denominators.	147	4-7					
*. add and subtract mixed forms with like denominators.	153	5-7					
*. add and subtract fractions with unlike denominators.	157	5-8					
*. add and subtract mixed forms with unlike denominators.	155	6-8					
. express addition and subtraction answers in simplest form.		5-8					
*. multiply fractions (proper and improper) by fractions and/or by whole numbers.	149	5-6					
. express fraction multiplication products in simplest forms.	159	5-8					
*. divide fractions.	167	5-7					
. divide mixed forms.	169	5-7					
. express fraction division quotients in simplest form.	159	5-8					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ____________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-7

Student Learning Objective(s) A. The student knows any integer can be expressed as a fraction. B. The student knows a fraction consists of a numerator (which is on top) and a denominator (which is on the bottom) with the line between as a symbol which means divide.

State Goal	1
District Goal	
Program Goal	2,7

Related Area(s)

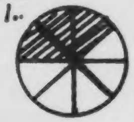
Suggested Activities: Grade(s) 5-6

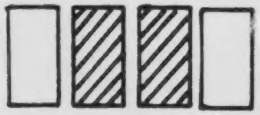
Title: Shady Fractions
Group Size: small group, entire class
Materials: worksheet

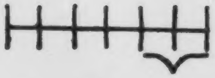
Procedure(s):

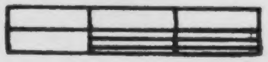
- Use a transparency or the chalkboard to illustrate an integer expressed as a fraction with numerator/denominator (5/6, 1/2, 1/4, etc.).
- Give the students a worksheet with sets with parts of the sets shaded or marked.
- Students are to indicate in a fraction form the part of the set that is shaded or marked.

Examples:

1.


2.


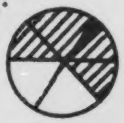
3.


4.


Variation:

- Indicate an incorrect fraction on the line below the sets and ask the students why it is incorrect.

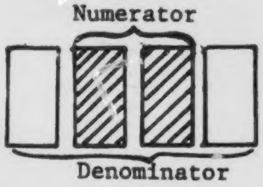
Example:



$\frac{3}{4}$ Why? ______

Suggested Monitoring Procedures

Have students label the numerator and denominator in the sets on the worksheet, i.e.,



Possible Resources

TR, Topic 55, Representing Common Fractions, Wisconsin Research and Development Center for Cognitive Learning, Rand McNally and Company, 1975

District Resources

Suggested Activities: Grade(s) _______

Title: Bingo
Group Size: entire class
Materials: Bingo cards (6 lines by 6 lines) to be made by students, markers

Procedure(s):

- Teacher puts 25 or more fractions on the board.
- Each student places the fractions on his/her own Bingo card in no particular order (at random).
- Teacher calls out one number to be used as a numerator and one number to be used as a denominator. Student having a fraction consisting of those numbers on his/her card, puts a marker on that space.
- Winner is first to "Bingo" in whatever pattern agreed on or designated at the start.

B	I	N	G	O
1/2	7/1	1/3	4/8	2/4
8/1	6/1	4/6	1/6	3/1
3/4	2/1	4/1	1/8	10/1
1/10	1/7	1/9	5/10	1/5
1/4	3/6	5/1	2/3	9/1

Suggested Monitoring Procedures

Teacher observation of the activity.

Possible Resources

District adopted text

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-7

Student Learning Objective(s) A. The student knows a fraction consists of a numerator (which is on top) and a denominator (which is on the bottom) with the line between as a symbol which means divide.

B. The student is able to identify and write fractions to represent an uncompleted division of two numbers.

Related Area(s)

State Goal	1
District Goal	
Program Goal	2,7

Suggested Activities: Grade(s) 5-6

Title:
Group Size: small group, entire class
Materials: worksheet

Procedure(s):
. Studv the example.
. Have students fill in the missing information.

Example: ●o = 1 out 2 = 1/2 = 1÷2 = $2\overline{)1}$

1.●●●oo = ______ = 3/5 = ________ = $5\overline{)3}$

2.●●●●●●
●●●●●o = 11 out of 12 = 11/12 = ____ = ______

3.●●●●●
●oooo = ______ = _______ = _____ = ______

4.oooo
oooo = _______ = _______ = _____ = $8\overline{)3}$

5.ooo = _______ = 0/5 = _______ = _______

6. one of your own:
_____ = _______ = _______ = _______ = ________

Suggested Monitoring Procedures

Peruse worksheets. Group students having difficulty with the concept and re-teach.

Possible Resources

Fundamentals of Mathematics, Stein, Edwin I., Allyn and Bacon Publishers, 1976

Holt School Mathematics, Nichols, et al, Holt Rinehart & Winston Publishing Co., 1974

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

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Suggested Objective Placement 5-7

Student Learning Objective(s) A. The student knows a fraction consists of a numerator (which is on top) and a denominator (which is on the bottom) with the line between as a symbol which means divide.

B. The student is able to write a fraction for part of a set.

State Goal	1
District Goal	
Program Goal	2,7

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Fraction Sets
Group Size: small group, entire class
Materials: large calendar, classroom objects

Procedure(s):

- Display a large calendar and compare a school week with a calendar week. Express this as a fraction and label the fraction, i.e.,

$$\frac{5}{7} \begin{array}{l} \leftarrow \text{School Week - Numerator} \\ \leftarrow \text{Calendar Week - Denominator} \end{array}$$

- Repeat this process using other examples from the calendar, i.e., Mondays as compared to all the weeks, all the days in the month, etc.
- Give students a worksheet and ask the following question to be expressed as a fraction: What fraction of the days of the week begin with: W, T, M, S.
- Give students a series of fractions on the worksheet such as: 1/2, 3/4, 5/6, etc. Have them circle the fractions that have a numerator of 3; cross out the fractions with a denominator of 6. (Varies with different combinations.)

Title: Spot the Sets
Group Size: small group, entire class
Materials: worksheet

Procedure(s):

- Make a fraction that compares the shaded circle to the total number of circles in the set, or shade

Suggested Monitoring Procedures

Peruse worksheets.

Give students a worksheet with sets similar to the activity and have them work the problems. In addition, have them label the numerator and denominator in the Set, i.e., (● 000)
numerator denominator

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) _______

Suggested Monitoring Procedures

Possible Resources

in the set to make it equivalent to the fraction.

Example:

(●000) = 1/4

(0000) =

(00000) =

(●000●0) =

(●●●●●●) =

(000000) = 2/6

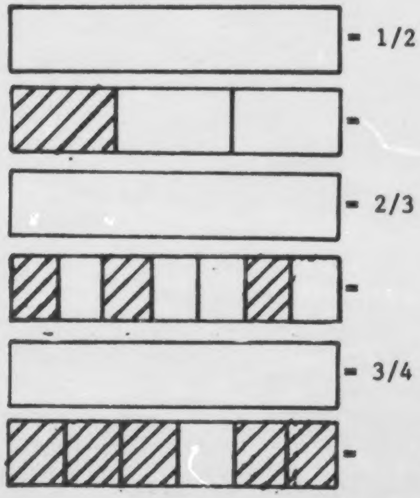
(0000000) = 0/7

Title: Fraction the Fractions
Group Size: small group, entire class
Materials: worksheet

Procedure(s):

. Have the students fill in the missing portions of each equivalent.

Example:



District Resources

Suggested Objective Placement 5-7

Student Learning Objective(s) A. The student knows any integer can be expressed as a fraction. B. The student is able to find fractions that are equivalent to given fractions.

State Goal	1
District Goal	
Program Goal	3,5,8

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Equivalence Chart
Group Size: entire class
Materials: worksheet (below) with the multiples chart and directions

Procedure(s):

- Have students complete this multiples chart by following directions (printed on worksheet).
  - Count by 3's to complete the third row, 4's to complete the fourth row, 5's to complete the fifth row, etc..
  - Choose any fraction for which the numerator and denominator can be found in the same column.
  - Move the same number of spaces to the left or right to find a new numerator and a new denominator.
  - This new fraction is equivalent to the one you started with.
- Repeat this activity as many times as you wish. Each time, write the pair of equivalent fractions.

Variation:

- Multiples chart could be printed on tagboard and done as a large or small group activity. The same set of directions could be given orally by the teacher.
  (See other side of page for chart.)

Suggested Monitoring Procedures

Observation.

Possible Resources

District adopted text.

District Resources

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Suggested Activities: Grade(s) ______

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12						
4	8								
5									
6									
8									
10									

Suggested Monitoring Procedures

Possible Resources

District Resources

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Suggested Objective Placement 4-7

Student Learning Objective(s) A. The student knows a fraction consists of a numerator (which is on top) and a denominator (which is on bottom) with the line between as a symbol which means divide. B. The student is able to order fractions with like denominators. C. The student is able to add and subtract fractions with like denominators.

Related Area(s)

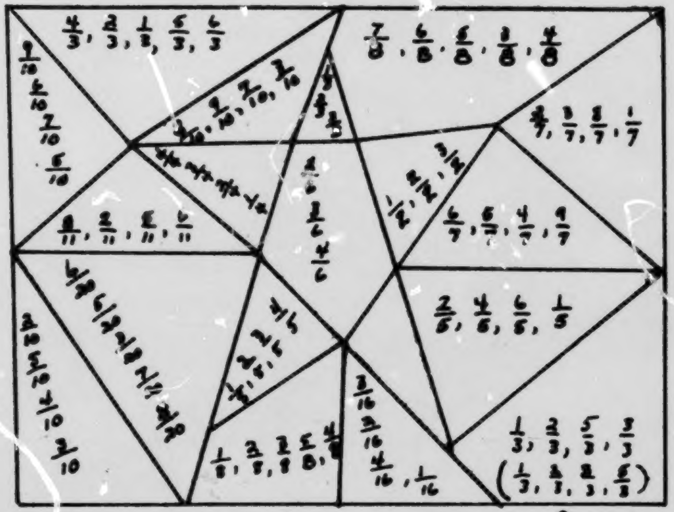
State Goal	1
District Goal	
Program Goal	2,5,6

Suggested Activities: Grade(s) 4-6

Title: Ordering Fractions
Group Size: entire class
Materials: worksheet

Procedure(s):

- Have students shade in areas that contain fractions listed in correct order (smaller to larger, or vice versa).
- Have students put all other fractions in the correct order. (See example given below)



Example

Suggested Monitoring Procedures

Observation of worksheets.

Possible Resources

District adopted text

District Resources

Suggested Activities: Grade(s) _______

Suggested Monitoring Procedures

Possible Resources

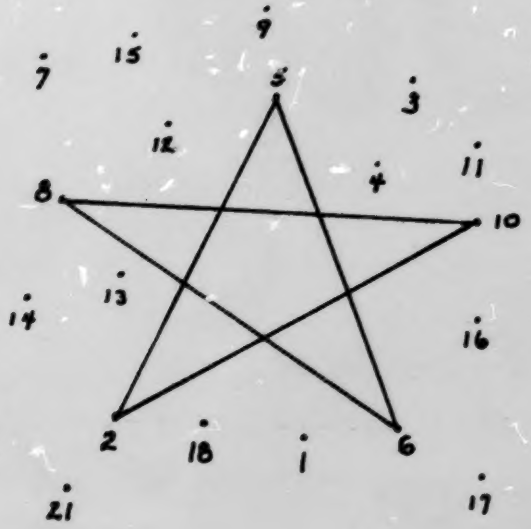
Title: Adding and Subtracting Fractions
Group Size: entire class
Materials: worksheet

Procedure(s):

- Have students do the problems on the worksheet.
- Have them follow the dots from small to large which correspond to the numbers of correct problems.

Example: **True** - **False**

1. 1/3 + 1/3 = 1/6
T 2. 3/5 + 1/5 = 4/5
3. 2/5 + 1/5 = 3/10
4. 8/9 - 2/9 = 5/9
T 5. 6/7 - 3/7 = 3/7
T 6. 2/9 + 5/9 = 7/9
7. 3/7 + 2/7 = 6/7
T 8. 4/7 + 2/7 = 6/7
9. 8/10 - 6/10 = 2/20
T 10. 10/13 - 8/13 = 2/13



District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-7

Student Learning Objective(s) A. The student knows proper fractions have numerators which are less than the denominator. B. The student knows improper fractions have numerators greater than or equal to a proper fraction. C. The student is able to multiply fractions (proper and improper) by fractions and/or by whole numbers.

State Goal: 1
District Goal:
Program Goal: 5,7,8

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Team Fractions
Group Size: small groups or teams
Materials: two noise makers (bells, clickers, etc.), random set of fraction problems, overhead or chalkboard

Procedure(s):

- Divide participants into small groups (about three per group).
- Put a problem on the chalkboard. Teams solve the problem as quickly as possible with paper and pencil. All members of each team try to solve problem. They should put their answer in its simplest form.
- The first person done rings a team bell (buzzer or clap hands).
- The teacher asks the student what he/she has for an answer. If the answer is correct, that team gets two points. If the answer is wrong, the other team gets one minute to work together and try to come up with a correct answer. If they do, they score one point; if they don't, the round is over, and the teacher proceeds with another problem.
- The first team to score ten points is the winner. Students can stay on and challenge another team or whatever.

Example of problems:

3/4 x 1/2, 4 x 1/2, 1 1/2 x 3/4, 2/3 x 2 1/3, 3/4 x 2

Suggested Monitoring Procedures

Teacher elicits student answers by giving the problem, observing students who have difficulty with specific type of problems.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) 5-6

Title: Proper or Improper
Group Size: pairs
Materials: set of fraction cards (proper and improper)

Procedure(s):

- Person in charge (teacher or student) turns a fraction card face up.
- Students identify whether it is proper or improper. The first student to identify it correctly, keeps the card.

NOTE: This activity can be repreated until all cards are gone, or the first student to win five cards can be declared the winner, etc.

Example:

Proper	Improper
3/4	7/6
1/2	4/3
5/6	9/8

Variation: Use concentration board and 16 proper and improper fraction cards.

Suggested Monitoring Procedures

Teacher or student aide can monitor.

Possible Resources

District adopted text.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-7

Student Learning Objective(s) A. The student knows improper fractions have numerators greater than or equal to the denominator. B. The student knows mixed numbers (form) consist of a whole number added to a proper fraction. C. The student is able to change mixed forms to improper fractions.

State Goal	1
District Goal	
Program Goal	2,5,6

Related Area(s)

Suggested Activities: Grade(s) 5-6

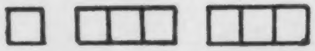
Title: Fractions and Mixed Numbers
Group Size: small groups
Materials: paper strips of equal size

Procedure(s):

- Draw lines to divide some of the strips in halves, thirds, fourths, etc..
- Cut some of the strips on halves, thirds, fourths, etc..
- Use the strips and partial strips to demonstrate mixed numbers.

Example:

$2\frac{1}{3} = \frac{7}{3}$



- Teacher can give fractions and students can work them out with models.

Title: Locate the Improper Fraction
Group Size: entire class
Materials: worksheet

Procedure(s):

- Students locate the improper fraction in each group.
- Match the corresponding letter (next to the number) with the number in the chart, and fill in the proper blanks. (see example of worksheet on the backside of paper)

$\overline{2}$ $\overline{3}$ $\overline{11}$ $\overline{8}$ $\overline{5}$ $\overline{9}$ $\overline{10}$ $\overline{1}$ $\overline{7}$ $\overline{11}$ $\overline{3}$ $\overline{4}$

$\overline{2}$ $\overline{6}$ $\overline{1}$

F R A C T I O N S A R E

$\frac{F}{2}$ $\frac{U}{6}$ $\frac{N}{1}$?

Suggested Monitoring Procedures

Observation of activity.

Give students a worksheet of mixed forms and have them change them to improper fractions, i.e.,

$1\frac{4}{5}$ $2\frac{1}{3}$ $6\frac{1}{8}$ $5\frac{1}{4}$ $3\frac{1}{2}$

Possible Resources

SEAMATH: Seattle Mathematics Program, Seattle Public Schools, Administration and Service, 815 Fourth North, Seattle, Wash. 98109

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

1	M $\frac{1}{2}$	P $\frac{2}{3}$	N $\frac{4}{3}$	R $3\frac{1}{2}$	S $\frac{2}{7}$
2	S $\frac{2}{5}$	B $3\frac{1}{3}$	G $\frac{1}{6}$	F $\frac{3}{2}$	A $\frac{2}{9}$
3	Q $\frac{6}{7}$	R $\frac{4}{1}$	S $\frac{6}{7}$	P $\frac{10}{12}$	Z $3\frac{2}{3}$
4	B $2\frac{1}{2}$	A $5\frac{1}{2}$	N $\frac{3}{4}$	O $\frac{9}{10}$	E $\frac{5}{3}$
5	T $\frac{4}{2}$	M $\frac{6}{9}$	J $\frac{2}{3}$	H 10	I $\frac{8}{11}$
6	K $\frac{4}{5}$	B $\frac{8}{9}$	U $\frac{12}{10}$	P $3\frac{1}{2}$	X 5
7	S $\frac{8}{7}$	U $\frac{4}{5}$	V $\frac{3}{5}$	M $6\frac{2}{3}$	B 10
8	D $\frac{3}{6}$	C $\frac{6}{4}$	M $\frac{2}{4}$	T $\frac{1}{5}$	U $10\frac{1}{2}$
9	L $\frac{14}{15}$	W $\frac{3}{9}$	Z $\frac{8}{10}$	I $\frac{8}{1}$	M $6\frac{2}{3}$
10	R $\frac{6}{7}$	O $\frac{7}{6}$	U $10\frac{2}{5}$	L $3\frac{1}{5}$	V $\frac{8}{12}$
11	S $\frac{11}{12}$	Q $\frac{3}{7}$	A $\frac{7}{2}$	B $8\frac{2}{3}$	Z $\frac{5}{6}$

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-7

Student Learning Objective(s) A. The student knows mixed numbers (forms) consist of a whole number added to a proper fraction. B. The student is able to add and subtract mixed forms with like denominators.

State Goal	1
District Goal	
Program Goal	2,5

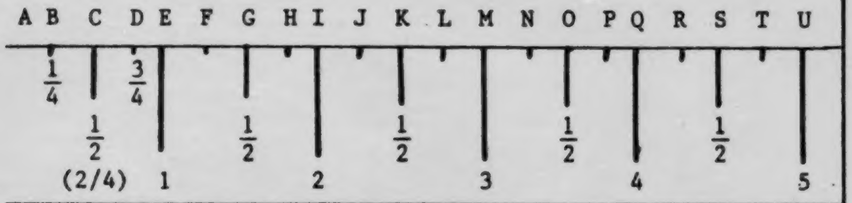
Related Area(s) ____________________

Suggested Activities: Grade(s) 4-6

Title: Rule the Ruler
Group Size: individual, entire class
Materials: worksheets

Procedure(s):

. Read and/or add the measurements as indicated.



(A) How far is it from "A" to:

.F 1-1/4"
.G ________
.H ________
.J ________
.O ________
.T ________

(B) Add the following measurement readings.

.AB (1/4") + GH (1/4") = 2/4" or 1/2"

.AC (/2") + E[illegible] (/2") = /2" or "

.AC (/4") + EG (/4") = /4" or "

Suggested Monitoring Procedures

Give students a worksheet with line segments they are to measure, add and subtract, using a ruler.

Possible Resources

Fundamentals of Mathematics, Stein, Edwin I., Allyn and Bacon, Publishers, 1976

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
		District Resources

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SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student is able to add and subtract mixed forms with unlike denominators.

State Goal	1
District Goal	
Program Goal	4,5,7

Related Area(s)

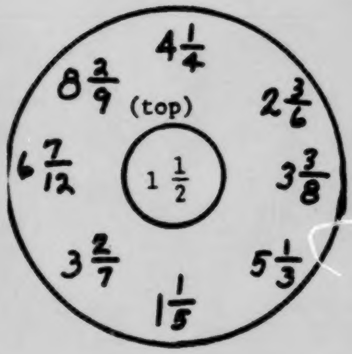
Suggested Activities: Grade(s) 6

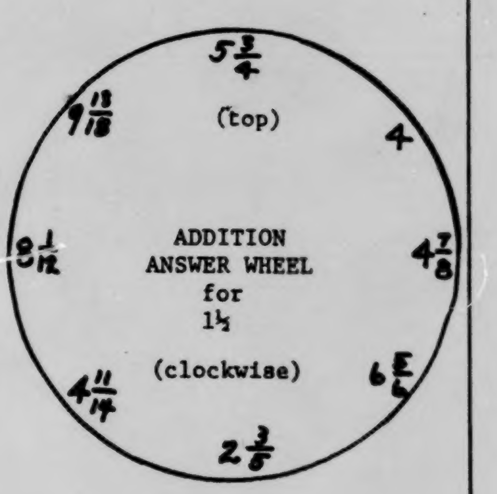
Title: Fraction Wheels
Group Size: individual, entire class
Materials: chalkboard or worksheet

Procedure(s):

- On each of the outer circles, place a set of mixed numbers with unlike denominators.
- On the inner circle, write the mixed number that is to be added to or subtracted from the set.
- After students work the problem they check their answers by slipping the answer wheel under the problems wheel. (Use a pin through the centers.)

Examples:


4 1/4
2 3/6
3 3/8
5 1/3
1 1/5
3 2/7
6 7/12
8 2/9
(top)
1 1/2


5 3/4
(top)
4
4 7/8
6 5/6
2 3/5
4 11/14
8 1/12
9 13/18
ADDITION
ANSWER WHEEL
for
1½
(clockwise)

Suggested Monitoring Procedures

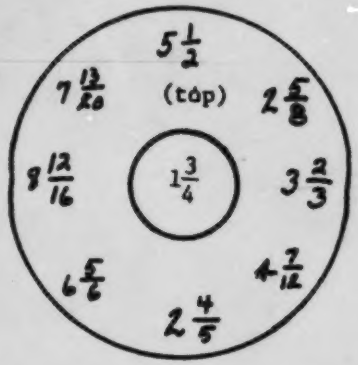
Make more difficult problem wheels for more capable students, easier ones for students having difficulty.

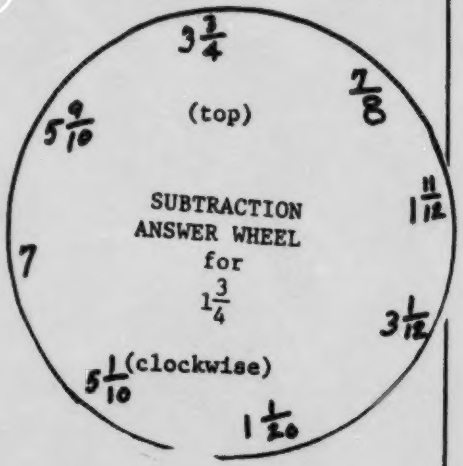
Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources


5 1/2
(top)
7 13/20
2 5/8
8 12/16
1 3/4
3 2/3
6 5/6
4 7/12
2 4/5


3 3/4
(top)
7/8
5 9/10
SUBTRACTION
ANSWER WHEEL
for
1 3/4
1 11/12
7
3 1/12
5 1/10 (clockwise)
1 1/20

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student is able to order fractions with unlike denominators.

B. The student is able to add and subtract fractions with unlike denominators.

State Goal	1
District Goal	
Program Goal	4,5,7

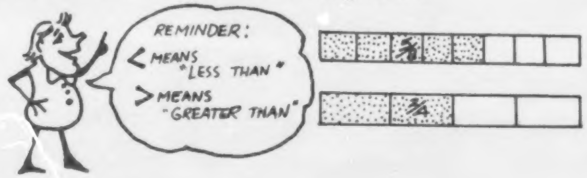
Related Area(s)

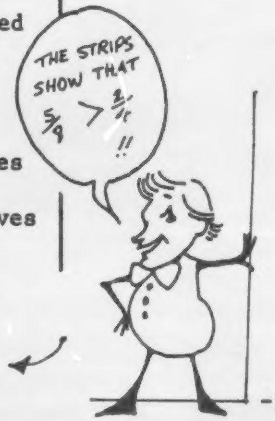
Suggested Activities: Grade(s) 5-6

Title: Fold a Fraction
Group Size: small groups
Materials: 1-inch grid paper, scissors, crayons, or colored pencils

Procedure(s):

- Have students:
  - Cut out 14 1" x 8" strips.
  - Fold two strips in half.
    Color half of one of the strips.
    Color both halves of the other strip.
  - Fold four strips in half and then in half again.
    Color one part of one of the strips, two parts of another, three parts of the third, and four parts of the last strip.
  - Fold eight strips in half, in half again, and in half a third time.
    Color one part of one, two parts of the second, and so on.
  - Write the fraction for the part that is colored on each strip.
  - Use strips to compare halves, fourths, and eighths:
    Use >, < and = to write comparisons.
  - Add fractions from the two strips, i.e., halves and fourths, fourths and eighths.
  - Subtract fractions from two strips, i.e., halves and fourths, fourths and eighths.




THE STRIPS SHOW THAT 5/8 > 2/4 !!

Suggested Monitoring Procedures

Observation to determine if students can order fractions of unlike denominators and add and subtract fractions with unlike denominators.

Possible Resources

SEAMATH: Seattle Mathematics Program, K-6: Seattle School District, 815 Fourth North, Seattle, Wash. 98109, 1975

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources

Title: Adding and Subtracting Fractions
Group Size: entire class
Materials: worksheet

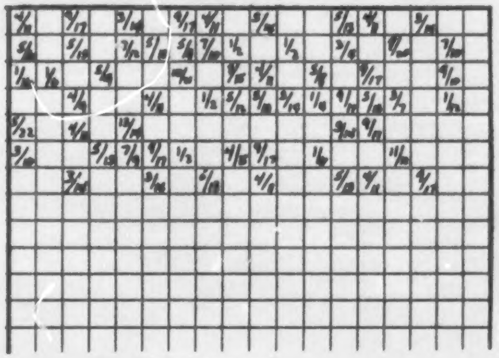
Procedure(s):

- Students complete problems and shade in correct answers on the chart.

  NOTE: Grade level can be changed by changing the degree of difficulty.

---

1. 1/2 + 1/3 =
2. 1/4 + 1/2 =
3. 1/6 + 1/3 =
4. 1/4 + 1/4 =
5. 1/3 + 1/4 =
6. 1/5 + 1/2 =
7. 1/9 + 1/3 =
8. 1/6 + 1/10 =
9. 1/5 + 1/4 =
10. 3/4 + 1/6 =
11. 11/12 - 5/6 =
12. 9/10 - 1/5 =
13. 1/2 - 1/3 =
14. 4/5 - 1/2 =
15. 5/6 - 2/3
16. 11/12 - 2/3 =
17. 4/7 - 2/14 =
18. 2/3 - 1/9 =
19. 5/7 - 3/14 =
20. 8/9 - 2/3
21. 8/9 - 1/3 =
22. 1/2 + 3/7 =
23. 7/10 + 1/5 =
24. 5/6 - 1/3 =
25. 1/5 + 1/3 =
26. 2/3 - 1/4 =
27. 1/3 + 1/7 =
28. 8/11 - 1/2 =
29. 5/16 - 1/4 =
30. 7/8 - 1/4 =



District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student is able to change fractions to simplest forms. B. The student is able to express fraction multiplication products in simplest forms. C. The student is able to express fraction division quotients in simplest form.

State Goal	1
District Goal	
Program Goal	2,7

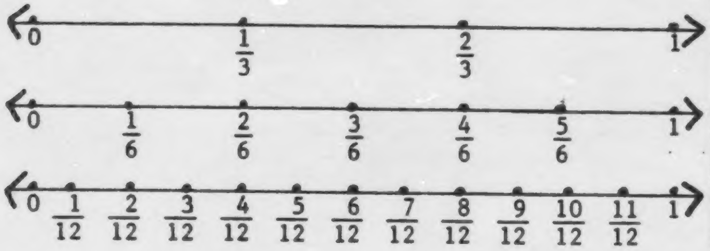
Related Area(s) ____

Suggested Activities: Grade(s) 5-6

Title: What is Equivalent?
Group Size: small group, entire class
Materials: overhead, chalkboard, worksheet

Procedure(s):

- On the overhead or on the chalkboard draw number lines to show equal fractions, i.e.,



- Have students demonstrate equal fractions such as 1/6 = 2/12, 2/3 = 4/6 = 8/12 on the number lines.
- Isolate fraction on the number lines such as 1/3 and show that if the numerator and denominator of 1/3 are multiplied by 2 it will equal 2/6:

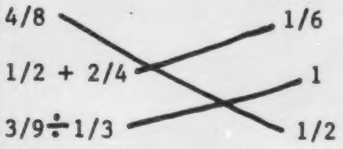
$$\frac{1}{3} \quad \begin{matrix} \nearrow 1 \times 2 \searrow \\ = \\ \searrow 2 \times 3 \nearrow \end{matrix} \quad \frac{2}{6}$$

- Isolate another equal fraction such as 10/12. Show that if both the numerator and denominator are divided by the same number an equal fraction will be the result, i.e.,

$$\frac{10}{12} \quad \begin{matrix} \to 10 \div 2 \to \\ \to 12 \div 2 \to \end{matrix} \quad \frac{5}{6}$$

Suggested Monitoring Procedures

Give students worksheet and ask them to match equal fractions, i.e.,



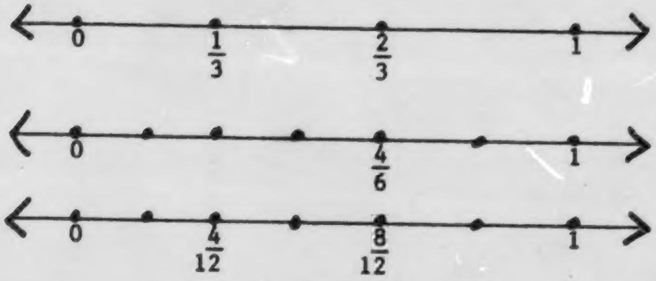
Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

- Remind students they can multiply or divide the numerator and the denominator of a fraction by the same number to find an equal fraction.
- Give students a worksheet with number lines that show equal fractions but only partially complete and have them complete the number lines, i.e.,



Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-6

Student Learning Objective(s) The student is able to locate a fractional number on a number line.

State Goal	1
District Goal	
Program Goal	2,7

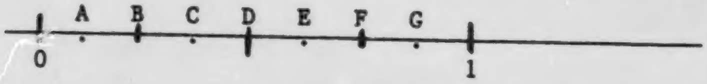
Related Area(s)

Suggested Activities: Grade(s) 5-6

Title:
Group Size: individual, entire class
Materials: worksheet

Procedure(s);

- Have students match the fractions with each point on the number line by filling in the blanks of the corresponding letter.



A______1/2

B______1/4

C______3/4

D______5/8

E______3/8

F______7/8

G______1/8

Suggested Monitoring Procedures

Check and reinforce with similar work on a ruler.

Possible Resources

Fundamentals of Mathematics, Stein, Edwin I, Allyn and Bacon, Publishers, 1976

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
		District Resources

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Suggested Objective Placement 5-8

Student Learning Objective(s) The student is able to express fraction division quotients in simplest form.

State Goal	1,8
District Goal	
Program Goal	5,6

Related Area(s)

Suggested Activities: Grade(s) 6	Suggested Monitoring Procedures	Possible Resources
Title: Ratio Race **Group Size:** small groups up to eight **Materials:** worksheet **Procedure(s):** . Each player chooses a letter from B - I. . When one player says "GO", both players look for the path of equal ratios from the circled letter at the top to a circle at the bottom. . The winner is the player who draws his/her path and puts the letter in the circle at the bottom first. . Path A has been drawn for you. All of the ratios in path A are equal. You can tell that this is so by using the cross products test. Example: $\frac{6}{10} = \frac{9}{15}$ is a true proportion since $6x15 = 9x10$. . Also, the simplest fraction form should be indicated by circling.	Independent project, or teacher can check results.	SEAMATH: Seattle Mathematics Program, Seattle Public Schools, 815 Fourth North, Seattle, Wash. 98109, 1975 **District Resources**

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Suggested Activities: Grade(s) ________

A	B	C	D	E	F	G	H	I
$\frac{12}{18}$	$\frac{4}{8}$	$\frac{9}{36}$	$\frac{20}{8}$	$\frac{5}{15}$	$\frac{24}{9}$	$\frac{10}{12}$	$\frac{20}{25}$	$\frac{12}{16}$
$\frac{7}{14}$	$\frac{4}{6}$	$\frac{25}{10}$	$\frac{5}{20}$	$\frac{56}{21}$	$\frac{7}{21}$	$\frac{25}{30}$	$\frac{21}{28}$	$\frac{32}{40}$
$\frac{3}{6}$	$\frac{45}{18}$	$\frac{2}{3}$	$\frac{16}{6}$	$\frac{8}{32}$	$\frac{2}{6}$	$\frac{40}{48}$	$\frac{12}{15}$	$\frac{6}{8}$
$\frac{10}{4}$	$\frac{2}{4}$	$\frac{20}{30}$	$\frac{40}{15}$	$\frac{9}{27}$	$\frac{10}{40}$	$\frac{30}{36}$	$\frac{15}{20}$	$\frac{24}{30}$
$\frac{5}{2}$	$\frac{16}{24}$	$\frac{6}{12}$	$\frac{72}{27}$	$\frac{7}{28}$	$\frac{3}{9}$	$\frac{27}{36}$	$\frac{15}{18}$	$\frac{8}{10}$
$\frac{35}{14}$	$\frac{10}{20}$	$\frac{6}{9}$	$\frac{4}{16}$	$\frac{48}{18}$	$\frac{4}{12}$	$\frac{50}{60}$	$\frac{9}{12}$	$\frac{28}{35}$
$\frac{8}{16}$	$\frac{15}{6}$	$\frac{3}{12}$	$\frac{10}{15}$	$\frac{10}{30}$	$\frac{80}{30}$	$\frac{20}{24}$	$\frac{16}{20}$	$\frac{18}{24}$
$\frac{40}{16}$	$\frac{5}{10}$	$\frac{6}{24}$	$\frac{6}{18}$	$\frac{14}{21}$	$\frac{45}{54}$	$\frac{64}{24}$	$\frac{30}{40}$	$\frac{40}{50}$
$\frac{9}{18}$	$\frac{50}{20}$	$\frac{8}{24}$	$\frac{2}{8}$	$\frac{35}{42}$	$\frac{18}{27}$	$\frac{6}{8}$	$\frac{32}{12}$	$\frac{36}{45}$
					A			

Suggested Monitoring
Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-8

Student Learning Objective(s) The student is able to express fraction division quotients in simplest form.

State Goal	1,8
District Goal	
Program Goal	5,6

Related Area(s)

Suggested Activities: Grade(s) 5

Title: Fraction Speed-O
Group Size: small group
Materials: small cards

Procedure(s):

- . Make up small sets of fractions not reduced to lowest terms, and another set of fractions in simplest form.
- . The teacher starts distributing the not reduced fraction cards to students (maybe five per student to start with).
- . The teacher turns over fraction cards in simplest terms, face-up, and says the name of the fraction.
- . Students look over their cards and, if they have the fraction card not reduced that corresponds to the teacher's card, the student says "SPEED-O".
- . Game proceeds at an informal pace.
- . There need not be winners or losers.

Variation:

- . Teacher could switch sets of cards, having a set of problem cards and an answer set, etc..

Example:

Not Reduced	Reduced
$\frac{6}{8}$	$\frac{3}{4}$
$\frac{8}{12}$	$\frac{2}{3}$

Suggested Monitoring Procedures

Give students a worksheet with terms not reduced in one column, and terms in simplest form (not in order) in a second column. Students are to match the two, i.e.,

b	6/8	a.	2/3
c	15/18	b.	3/4
a	8/12	c.	5/6
e	4/16	d.	1/2
d	5/10	e.	1/4

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	**Suggested Monitoring Procedures**	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-7

Student Learning Objective(s) The student is able to divide fractions.

State Goal 1,8

District Goal

Program Goal 5,6

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Dividing Fractions and/or Mixed Numbers

Group Size: small group, entire class

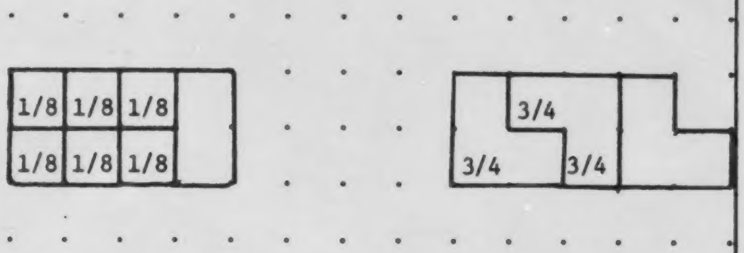
Materials: paper, pencil

Procedure(s):

- Have students reproduce models of problems on dot paper.
- Later students can make up and solve their own problems.

Example:

3/4 ÷ 1/8	2 1/4 ÷ 3/4
there are 6 - 1/8's in 3/4 or 3/4 ÷ 1/8 = 6	there are 3 - 3/4's in 2 1/4 or 2 1/4 ÷ 3/4 = 3



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Suggested Monitoring Procedures

Observation.

Possible Resources

Fun and Games With Mathematics
Hangaard and Horlock,
Prentice Hall

District Resources

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Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-7

Student Learning Objective(s) The student is able to divide mixed forms.

State Goal	1,8
District Goal	
Program Goal	5,6

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Fraction Relay
Group Size: entire class
Materials: paper, pencil

Procedure(s):

- Teacher gives a problem to the class.
- Each student works the problem as fast as possible.
- When students have completed the problem, they pass their papers forward where the first person in the row (captain) compares the answers.
- If all answers are the same the captain writes the answer on the board.
- The first row with all answers correct and the answer on the board wins that round.
- If the answers don't favorably compare, the captain will return the incorrect problems and have the students work them again.
- The first row to get an agreed upon number of problems correct wins the game.

Example:

1. $6 \div 3\frac{1}{2} =$ ______ $(1\frac{5}{7})$
2. $1\frac{1}{2} \div \frac{1}{4} =$ ______ (6)
3. $6\frac{2}{3} \div 3 =$ ______ $(2\frac{2}{9})$
4. $2\frac{1}{2} \div 1\frac{1}{2} =$ ______ $(1\frac{2}{3})$
5. $2 \div 1\frac{1}{2} =$ ______ $(1\frac{1}{3})$

Suggested Monitoring Procedures

Observe; group students having difficulty for remedial help.

(Teacher has correct answers to compare to those on the board.)

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Rational Numbers: Ratios, Percentage, Proportion

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. a ratio is a way of comparing two numbers by division, i.e., the ratio of a to b is $\frac{a}{b}$.	173	6-8					
. a ratio can be expressed in the following forms: a to b or $\frac{a}{b}$.	173	6-8					
. a percent is defined as a ratio with denominator of one hundred and is denoted by the symbol %, i.e., 50% is $\frac{50}{100}$.		7-8					
. the meaning of the key terms associated with percent: base, rate, and percentage.		7-8					
. base x rate = percentage.		7-8					
. areas of application for percent: banking, commerce, statistics, communications.		7-8					
. a proportion is a statement of equality between two ratios, i.e., $\frac{2}{4} = \frac{6}{12}$.		7-8					
. in a proportion the cross-products are equal, i.e., for b and $d \neq 0$, $\frac{a}{b} = \frac{c}{d}$ implies ad=bc.		7-8					
The student is able to:							
* . rename any rational number as a percent, i.e., .05=5%; .5=50%; $\frac{3}{4}$ = 75%; 2 = 200%; 1½ = 150%.		7-8					
* . rename a number in a percent form as either a fraction or decimal i.e., 100% = 1.00; 75% = .75 = $\frac{3}{4} = \frac{75}{100}$ 150% = $\frac{3}{2} = \frac{150}{100}$ = 1½ = 1.5 33 1/3% = $\frac{1}{3}$ = .333...		7-8					
* . solve the three types of percentage problems: a% of b = c, i.e.,							
a. given a and b, find c (find 25% of 60).		7-8					
b. given b and c, find a (what percent of 90 is 45?)		7-8					
c. given a and c, find b (25 is 50% of what number?)		7-8					
* . solve for the missing value of a given proportion, i.e., $\frac{8}{X} = \frac{2}{7}$.		7-8					
* . solve simple word problems involving percent: interest, commission, compound interest, % of change, discount, price.		7-8					

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OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ________________

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows a ratio is a way of comparing two numbers by division, i.e., the ratio of a to b is $\frac{a}{b}$. B. The student knows a ratio can be expressed in the following forms: a to b or $\frac{a}{b}$.

State Goal	1
District Goal	
Program Goal	2,7,8

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Rain Ratio
Group Size: entire class
Materials: daily record sheet

Procedure(s):

- Have students estimate at the beginning of the school year how many school days will be wet and how many will be dry.
- Keep a daily record of dry school days compared to wet school days.
- Have students express these days as a ratio..
- Note that the ratio will change daily.
- At the end of each class day it will be determined how to classify that school day (use school hours only) according to pre-set standards of what constitutes a "rainy day."
- Give a prize to the student whose estimation is closest to the actual wet and dry days.

Title: Attendance Ratio
Group Size: entire class
Materials: daily record sheet

Procedure(s):

- Keep a record of attendance for each day of the week and for the month.
- Have students compare, in a ratio form, attendance for each week day compared with the other four; one week to another; one month to another.

Suggested Monitoring Procedures

Survey student data.
Have students put a variety of data in a ratio form on a worksheet.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) 6

Title: Ratio Survey
Group Size: entire class
Materials:

Procedure(s):

- Survey the class (either orally or on paper) as to such ratios as:
  - left-handed to right-handed.
  - odd-numbered birthdays to even-numbered birthdays.
  - those having at least one brother/sister to those having none.
  - blonds to brunets.
  - those able to swim for five minutes to those unable to swim.
  - those who have flown (or sailed, or ridden on a train, etc., to those who have not).
  - those who have broken bones to those who have not.
  - those who walk to school to those who ride the bus.
  - those born in Washington State to those born outside.
  - those who have travelled out-of-state to those who have not.
  - those who have been hospitalized (except for birth) to those who have never been hospitalized.
  - horse riders to those who have never ridden a horse.
  - foreign car families to domestic car families.
  - those who have visited Canada to those who have not.

Suggested Monitoring Procedures

Possible Resources

District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Rational Numbers: Decimals

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8
The student knows:							
The student is able to:							
*. read and write decimals to the thousandths.	175	6-8					
*. read and write decimals to hundred thousandths.		7-8					
. express a decimal in expanded form to thousandths, i.e., $.438 = \frac{4}{10} + \frac{3}{100} + \frac{8}{1000}$	177	6					
. express a decimal in expanded form to hundred thousandths.		7-8					
. express the expanded form of a fraction in decimal form, i.e., $\frac{4}{10} + \frac{3}{100} + \frac{8}{1000} = .438$	177	6-8					
*. order decimals on number line.	181	6-8					
*. round decimals to hundredths, i.e., .763 → .76	179	6-7					
*. round decimals to tenths, i.e., 284 → .3		6-7					
*. round decimals to thousandths.		7-8					
. round decimals to ten thousandths.		7-8					
*. add and subtract decimals to thousandths.	183	6					
*. add and subtract decimals to hundred thousandths.	183	7-8					
*. multiply and divide decimals to thousandths.	185	7-8					
. multiply and divide decimals to hundred thousandths.	185	7-8					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ______

Suggested Objective Placement 6-8

State Goal	1
District Goal	
Program Goal	1,3

Student Learning Objective(s) A. The student is able to read and write decimals to the thousandths.

B. The student is able to express a decimal in expanded form to thousandths, i.e., $.438 = \frac{3}{10} + \frac{4}{100} + \frac{8}{1000}$. C. The student is able to express the expanded form of a fraction in decimal form, i.e., $\frac{4}{10} + \frac{3}{100} + \frac{8}{1000} = .438$

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Decimal Expando

Group Size: small group, entire class

Materials: cards (3" x 5" or 3" x 3")

Procedure(s):

- Have students make a number of cards with basic numerals 1 - 9, a decimal point card, two plus sign cards, and an equal sign card.
- In addition, have students make cards with expanded fraction forms of each number, i.e., $\frac{1}{10}, \frac{1}{100}, \frac{1}{1000}, \frac{2}{10}, \frac{2}{100}, \frac{2}{1000}$, etc.
- Read a number and have students form the number with their cards, i.e.,

$$\boxed{.}\quad\boxed{3}\quad\boxed{2}\quad\boxed{5}$$

- Have students match the decimal number with the expanded form in fractions, i.e.,

$$\boxed{=}\ \boxed{\frac{3}{10}}\ \boxed{+}\ \boxed{\frac{2}{100}}\ \boxed{+}\ \boxed{\frac{5}{1000}}$$

Variation:

- Reverse the procedure.

Suggested Monitoring Procedures

Walk among students (class) or observe (small group) to see if they have arranged cards correctly.

Possible Resources

District adopted text.

District Resources

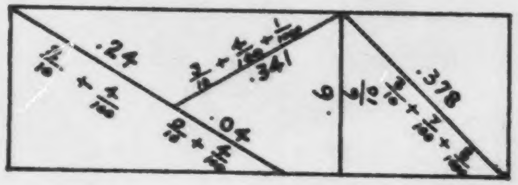
Suggested Activities: Grade(s) 6

Title: Decimal Puzzle
Group Size: pairs
Materials: paper, ruler, scissors

Procedure(s):

- Have each student make a design like this one. Each segment in the design should have a decimal (to the thousandth) on one side and its expanded form on the other side.

Example:


.24
$\frac{2}{10} + \frac{4}{100}$
.341
$\frac{3}{10} + \frac{4}{100} + \frac{1}{1000}$
.04
.6
$\frac{6}{10}$
.378
$\frac{3}{10} + \frac{7}{100} + \frac{8}{1000}$

- Cut apart the design to make a puzzle.
- Have students trade puzzles and try to put them back together by matching the decimal and its expanded form.

Suggested Monitoring Procedures

Give students a worksheet with decimals and have them write the expanded notation, i.e.,

$.6 = \frac{6}{10}$, $.25 = \frac{2}{10} + \frac{5}{100}$

$.75 = \frac{7}{10} + \frac{5}{100}$; $.251 = \frac{2}{10} + \frac{5}{100} + \frac{1}{1000}$

Possible Resources

District adopted text.

District Resources

SMALL SCHOOLS PROJECT- Working Copy

Suggested Objective Placement 6-7

Student Learning Objective(s) A. The student is able to round decimals to hundredths, i.e., .763 .76 B. The student is able to round decimals to tenths, i.e., .284 .3

State Goal	1
District Goal	
Program Goal	1,3

Related Area(s)

Suggested Activities: Grade(s) 6

Suggested Monitoring Procedures

Possible Resources

Title: Unblank the Blank
Group Size: individual, entire class
Materials: worksheet (below)

Procedure(s):

. Round each number below to the nearest hundredths Find answer in code area. Place letter above problem number.

The purpose of a test is to:

___ ___ ___ ___ ___   T ___ ___   ___ ___ ___ ___ ___
4 9 12 3 10   1 6 8   13 7 11 2 5

R	I	D	N	O	A	A	R	N	B	E	I	Y	H	T
7.25	4.68	4.49	7.21	4.67	6.80	3.99	3.61	7.85	4.50	3.76	3.96	7.24	4.66	3.16

1) 3.1587 = 3.16
2) 4.6849
3) 3.9552
4) 4.4928
5) 7.8462
6) 4.66098
7) 7.2537
8) 3.75531
9) 3.6052
10) 7.21498
11) 3.9874
12) 6.79536
13) 4.4982

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) The student is able to order decimals on number line.

State Goal	1
District Goal	
Program Goal	3,4,7

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Number Line Code
Group Size: individual, entire class
Materials: worksheets

Procedure(s):

. The teacher makes a worksheet with coded messages for the students to do.

Example:

WORKSHEET________ DATE________ NAME__________

1 .25 .5 .75 2 .5 3 .5

Directions:
Write in each decimal number on the above number line in its place. Below each decimal number written in, write its corresponding letter to form a message.

3.2 = S
2.01 = L
1.25 = H
2.35 = P
1.33 = E
3.00 = U

Suggested Monitoring Procedures

Give students worksheets of number lines with some decimal numbers shown and have them complete the number line.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
		District Resources

370

371

SMALL SCHOOLS PROJECT

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student is able to add and subtract decimals to thousandths.

B. The student is able to add and subtract decimals to hundred thousandths.

State Goal	1
District Goal	
Program Goal	5

Related Area(s)

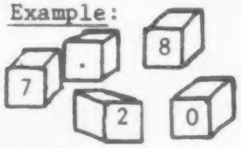
Suggested Activities: Grade(s) 6

Title: Roll a Decimal
Group Size: small groups
Materials: paper, pencil, five cubes--four cubes have a number from 0-9 on each face and one cube has a decimal point on each face

Procedure(s):

- A student shakes and tosses the dice. (Dice should have about a foot square area or larger to land in so a spread of dice can be obtained.)
- The dice are then pulled into a line in approximate order that they spilled out.

Example:



7.280

This allows the decimal point to be positioned in various places.

- After each toss, the students write down the number. After X number of tosses, the students add.
- Students may subtract with two tosses.

Suggested Monitoring Procedures

Teacher observation.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 7-8

Student Learning Objective(s) A. The student is able to multiply and divide decimals to thousandths. B. The student is able to multiply and divide decimals to hundred thousandths.

State Goal	1
District Goal	
Program Goal	5

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Math Puzzle
Group Size: entire class
Materials: worksheet of puzzle

Procedure(s):

- The puzzle should be solved using the designated numerals, logical thinking, and trial and error to find values for the letters.
- Each letter represents one number less than ten.
- No number is represented by more than one letter, and a letter represents the same number each time it appears.

```
             W 4.F
N.W4 /H R. H 8 R
     -W 4  8
        F  F 8
      -4   N 6
           6 W R
          -6 W R
               R
```

- Solution: N-1, W=2, H=3, F=5, R=0
- For extended activity, have students make up puzzles and exchange them.

Suggested Monitoring Procedures

Worksheets of division and multiplication problems, or textbook problems that can be corrected for correct procedure as well as accuracy.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources

District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Numeration: Number Theory

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. whole numbers are either even or odd.	189	4					
. a prime number is a number divisible by 1 and itself only.	189	5-8					
. numbers that are divisible by a number other than 1 and itself are composite.	193	6-8					
. a composite number can be expressed as the product of primes in only one way ($24=2\cdot2\cdot2\cdot3$).	193	6-8					
. the greatest common factor (g.c.f.) of two or more numbers is the largest of the common divisors of the numbers.	197	6-8					
. the least common multiple (l.c.m.) of two or more numbers is the smallest of the common multiples of the numbers.	201	6-8					
. there are divisibility tests for 2, 3, 4......10 (except 7) and they can be used to help factor.	203	6-8					
The student is able to:							
. find the primes less than 100.	189	5-6					
. do a prime factorization of a number.		6-8					
* . find the g.c.f. of two or more numbers: $18 = 2\cdot3\cdot3$ $24 = 2\cdot2\cdot2\cdot3 \quad \text{g.c.f.} = 2\cdot3$ $= 6$	197	6-8					
* . find the l.c.m. of two or more numbers: $8 = 2\cdot2\cdot2 \quad \text{l.c.m.} = 2\cdot2\cdot2\cdot3$ $6 = 2\cdot3 \quad = 24$	201	6-8					
. use divisibility tests for 2, 3 and 5 as an aid in finding the prime factorization.	203	6-8					
The student values:							
. numbers as a natural phenomenon and not man-made.	189	4-8					
. numerals as the symbols we use to represent numbers.	189	4-8					

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ________________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows whole numbers are either even or odd. B. The student knows a prime number is a number divisible by 1 and itself only. C. The student is able to find the primes less than 100. D. The student values numbers as a natural phenomenon and not man-made

State Goal	1
District Goal	
Program Goal	1,2,8

Related Area(s) E. The student values numerals as the symbols we use to represent numbers.

Suggested Activities: Grade(s) 4-6

Title: Even-Odd
Group Size: six at a time
Materials: blindfolds

Procedure(s):

- Six students are blindfolded and put at one end of the room.
- The teacher calls out "odd" and then a number.
- If that number is odd, the students step forward one step (try to make each student step approximately the same).
- If it is not odd, they stay where they are.
- The teacher then calls out, "even." and a number, and the students do the same thing.
- The teacher continues calling odd and even numbers and the students continue taking steps.
- If anyone makes a mistake he/she must back up a step from his/her previous position.
- The first student to reach the other end of the room wins.
- Hint:
  If the students walk through the rows, it will help keep them on course.

Suggested Monitoring Procedures

Teacher observation.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) 4-6

Title: Even-Odd Chart
Group Size: entire class
Materials: grid paper, color crayons

Procedure(s):

- Have students make a chart of numbers 1 through 100 with ten numbers in each row.
- Have students make all odd number black and all even numbers red.
- Ask students if they notice any patterns that appear on the chart.
  - Even numbers appear in even numbered columns.
  - Odd numbers appear in odd numbered columns.
  - All even numbers ending in 2 appear in the second column; all even numbers ending in 4 in the fourth column; all even numbers ending in 6 in the sixth column; all even numbers ending in 8 in the eighth column; and all even numbers ending in zero in the tenth column.
- Have students add numbers across columns to see if additional patterns develop.
  Add numbers in column two and four. Answer appears in column six.
  Add numbers in columns three and seven. Answer appears in column ten.
- Have students add two even numbers. What will their answer be? (even)
- Have students add two odd numbers. What will their answer be? (even)

Example:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Suggested Monitoring Procedures

Possible Resources

Mathematics Around Us
Scott, Foreman and Co.
Palo Alto, California
1975

District Resources

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows whole numbers are either even or odd. B. The student knows a prime number is a number divisible by 1 and itself only. C. The student is able to find the primes less than 100. D. The student values numbers as a natural phenomenon and not man-made

Related Area(s) E. The student values numerals as the symbols we use to represent numbers.

State Goal	1
District Goal	
Program Goal	1,2,8

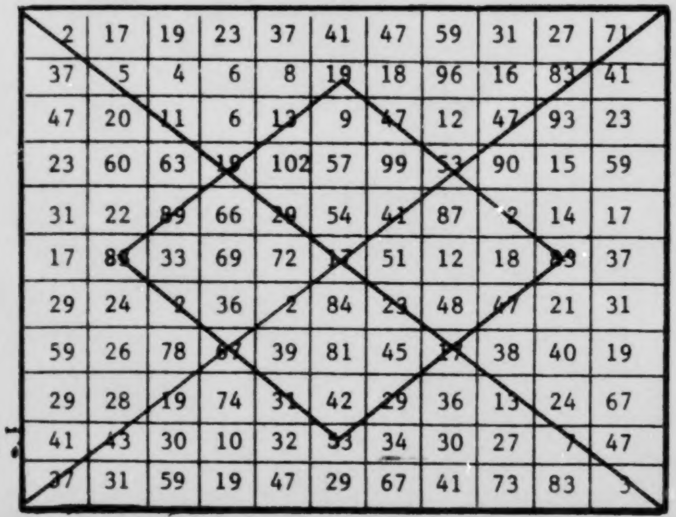
Suggested Activities: Grade(s) 6

Title: Find the Primes
Group Size: entire class
Materials: worksheets

Procedure(s):
- . Define prime numbers as having only two divisors or factors: one and the number itself.
- . Students draw a line connecting all prime numbers on the sheet.
- . If done correctly, a message or pattern will appear.

Variation:
- . Cross out evens or odds.
- . Composites (has more than two divisors)
- . Multiples of various numbers.
- . Vary the degree of difficulty to match the ability level.

Example:



2	17	19	23	37	41	47	59	31	27	71
37	5	4	6	8	19	18	96	16	83	41
47	20	11	6	13	9	47	12	47	93	23
23	60	63	19	102	57	99	53	90	15	59
31	22	89	66	29	54	41	87	2	14	17
17	89	33	69	72	17	51	12	18	83	37
29	24	2	36	2	84	23	48	47	21	31
59	26	78	67	39	81	45	17	38	40	19
29	28	19	74	31	42	29	36	13	24	67
41	43	30	10	32	53	34	30	27	7	47
37	31	59	19	47	29	67	41	73	83	3

Suggested Monitoring Procedures

Possible Resources

Mathematics Around Us (Grade 6)
Scott, Foresman and Co.
Palo Alto, California
1975.

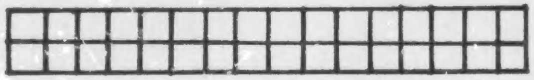
District Resources

Suggested Activities: Grade(s) 6

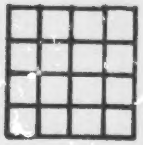
Title: Prime Arrays
Group Size: small group
Materials: grid paper, construction paper, scissors, paste or glue

Procedure(s):

- Have students use grid paper to make all possible multiplication arrays for numbers from 2 through 25:

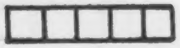


2 x 16 or 16 x 2



4 x 4

1 x 5



- Have them make a display of the arrays for each of the numbers on construction paper.
- Have them display numbers with one array on construction paper. These are the prime numbers.

Suggested Monitoring Procedures

Possible Resources

SFA MATH: Seattle Mathematics Program: K-6
Seattle School District
815 Fourth North
Seattle, Wn. 98109
1975

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows numbers that are divisible by a number other than 1 and itself are composite. B. The student knows a composite number can be expressed as the product of primes in only one way (24 = 2·2·2·3). C. The student values numbers as a natural phenomenon and not man-made. D. The student values numerals as the symbols we use to represent numbers.

Related Area(s)

State Goal 1

District Goal

Program Goal 1,2,6

Suggested Activities: Grade(s) 6

Title: Prime vs. Composite
Group Size: entire class or small group
Materials: worksheet or chalkboard

Procedure(s):

- Draw a chart on the chalkboard or give students a worksheet as shown in the example.
- Discuss the definition of prime numbers (a number with only two divisors or factors, one and the number itself).
- Discuss the definition of composite numbers (numbers with more than two divisors or factors).
- Have students complete the chart.
- Ask students to list the prime and composite numbers in the chart. Ask them for examples of other composite numbers.
- Ask students why 1 and 0 were not placed on the chart (they are neither prime or composite).

Example:

Number	Divisors or Factors	
2	1,2	prime
3	1,3	prime
4	1,2,4	(composite)
5		(1,5) prime
6	1,2,3,6	(composite)
7		(1,7) prime
15		(1,5,3,15) composite
18		(1,2,3,6,9,18) composite
28		(1,2,4,7,14,28) composite
29		(1,29) prime
32		(1,2,4,8,16,32) composite

Suggested Monitoring Procedures

Give students a worksheet of prime and composite numbers. Have students circle the prime numbers.

Possible Resources

Mathematics Around Us
Scott, Foresman and Co.
Palo Alto, California
1975.

District Resources

Suggested Activities: Grade(s) _______

Title: International Numerals
Group Size: entire class
Materials: worksheets, as needed

Procedure(s):

- The "idea" of this many items (numbers) can be expressed in these various ways (names, numerals).
- Have the students complete the chart.

	English	French	German	Mayan	Chinese	Roman	Arabic
.	One	Un	Eins	•	一	I	1
..	Two	Deux	Zwei	••	二	II	2
...	Three	Trois	Drei	•••	三	III	
	Four	Quatre	Vier	••••	四		4
.....		Cinq	Funf	—	五	V	5
••••• •		Six	Sechs	• —	六		
		Sept	Sieben	•• —	七		7
•• ⁝⁝⁝		Huit	Acht	••• —	八		8
• ⁝⁝⁝⁝		Neuf	Neun		九		9
		Dix	Zehn	— —	十	X	

Suggested Monitoring Procedures

Discuss origins of number systems as a followup, suggesting library and reference sources for additional interest.

Possible Resources

District adopted text

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows numbers that are divisible by a number other than 1 and itself are composite. B. The student knows a composite number can be expressed as the product of primes in only one way (24 = 2·2·2·3). C. The student values numbers as a natural phenomenon and not man-made. D. The student values numerals as the symbols we use to represent numbers.

Related Area(s)

State Goal	1
District Goal	
Program Goal	1,2,6,7

Suggested Activities: Grade(s) 6

Title: Concentration with Composites
Group Size: pairs
Materials: concentration gameboard with 16 squares

Procedure(s):

. Sixteen cards (squares) to cover the squares on the gameboard, eight of one color and eight of another.

. Eight of the cards are composite numbers.

Example:

24 4 14 6 48 36 81 9

. Eight of the cards have composite numbers expressed as the product of primes.

2·2·2·3 2·2 7·2 3·2 3·2·2·2·2 3·2·3·2
3·3·3·3 3·3

. Place all cards face down on the gameboard so that neither player knows which card is which.

. The first player turns up two cards, one of each color.

. If the player turns up a matching pair he/she keeps the cards and takes another turn.

. If a matching pair was not turned up, the cards are turned face down in their original position after giving the other player a chance to see them.

. The next player turns up two cards and play continues.

Suggested Monitoring Procedures

Give students a list of composite numbers and have them express the composite as the product of primes, i.e., 24 = 2·2·3

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) 6

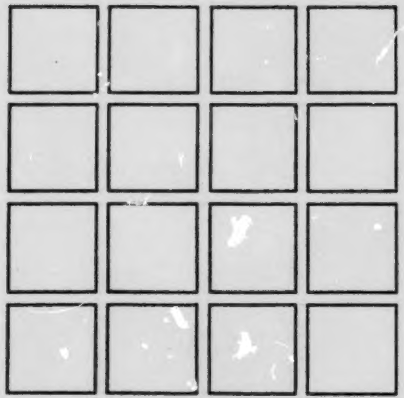
Suggested Monitoring Procedures

Possible Resources

- When all the cards have been taken, the player with the most cards is the winner.

Example of Gameboard:

CONCENTRATION



Game Board

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows the greatest common factor (g.c.f.) of two or more numbers is the largest of the common divisors of the numbers. B. The student is able to find the g.c.f. of two or more numbers:

$$18 = 2\ 3\ 3$$
$$24 = 2\ 2\ 2\ 3 \quad \text{g.c.f.} = 2\ 3$$
$$= 6$$

State Goal	1
District Goal	
Program Goal	2,3,7

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Find the Greatest Common Factor
Group Size: entire class
Materials: chalkboard, overhead, worksheet

Procedure(s):

- Write the factors of 12 and 20 on the overhead or chalkboard and circle all common factors.
  i.e. factors of 12: 1, 2, 3, 4, 6, 12
  factors of 20: 1, 2, 4, 5, 10, 20
- Ask students what is the largest factor of both numbers (answer 4). Point out that 4 is the greatest common factor (g.c.f.).
- Repeat the process with several other numbers.
- Point out that the g.c.f. is always less than or equal to the smaller number of the two.
- Give students a worksheet of numbers and ask them to find the g.c.f.
- Have students use a chart to assist them in finding the g.c.f.

Example:

Number	Factors	GCF
18	1 2 3 6 9 18	9
27	1 3 9 27	

Suggested Monitoring Procedures

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) _______

Title: Sets of Factors
Group Size: pairs
Materials: 15 blank cards, chart, crayon or felt pen, 8 markers

Procedure(s):

- Teacher or students make the "Factor Sets" cards. Make a card for each of the following numbers: 4,5, 6,7,8,9,10,12,16,18,20,21,24,25
- Shuffle the cards. Turn one of them face up.
- Each players uses his or her markes to cover the numbers on the chart that are factors of the number on the card, i.e., if the card number is 8, put markers on 1,2,4 and 8, since each of these numbers is a factor of 8.

Example of Chart:

1	2	3	4	5	6	7	8	9
10	12	15	16	18	20	21	24	25

- Each player who covers the set of factors correctly gets a point. If a mistake is made, no points are given.
- The winner is the player who has the most points after all cards have been played.

Suggested Monitoring Procedures

Teacher observation of activities.

Possible Resources

SEAMATH: Seattle Mathematics **Program:** K-6, Seattle Public Schools, 815 Fourth North, Seattle, Wa. 98109, 1975.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

State Goal	1
District Goal	
Program Goal	2,3,7

Student Learning Objective(s) A. The student knows the greatest common factor (g.c.f.) of two or more numbers is the largest of the common divisors of the numbers. B. The student is able to find the g.c.f. of two or more numbers:

$$18 = 2\cdot3\cdot3$$
$$24 = 2\cdot2\cdot2\cdot3 \quad \text{g.c.f.} = 2\cdot3 = 6$$

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Euclid's Method of Finding G.C.F.

Group Size: entire class

Materials: paper, pencil

Procedure(s):

- Each row is a team.
- Give two fairly large numbers to the class.
- The first person in each row works the 1st step in Euclid's Method and hands the paper back to the next person.
- The second person works the second step and passes the paper back.
- The paper is continually being passed until someone finds the G.C.F. of the 2 original numbers.
- The person who discovers the G.C.F. writes it on the board or calls it out and that row wins the round.

Example:

Divide the larger by the smaller.

$$\begin{array}{r} 8 \\ \textcircled{28}\overline{)242} \\ 224 \\ \hline \textcircled{18} \end{array}$$

Divide the divisor by the remainder.

$$\begin{array}{r} 1 \\ \textcircled{18}\overline{)28} \\ 18 \\ \hline \textcircled{10} \end{array}$$

Repeat until the remainder is 0.

$$\begin{array}{r} 1 \\ \textcircled{10}\overline{)18} \\ 10 \\ \hline \textcircled{8} \end{array}$$

The G.C.F. is the last non-zero remainder

$$\begin{array}{r} 1 \\ \textcircled{8}\overline{)10} \\ 8 \\ \hline \textcircled{2} \end{array} \qquad \begin{array}{r} 4 \\ \textcircled{2}\overline{)8} \\ 8 \\ \hline \textcircled{0} \end{array}$$

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) 6

Suggested Monitoring Procedures

Possible Resources

Title: Reverse Time Tables
Group Size: entire class
Materials: chalkboard

Procedure(s):

- Put two numbers on board, each set being answers from the multiplication tables of one series (8 and 24).
- The class response might be 2, 4 or 8, with 8 the preferred answer.
- Daily drill will increase awareness of G.C.F.

Variation:

- Divide the class into teams, devise a point system and play as a game.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

State Goal	1
District Goal	
Program Goal	2,3,7

Student Learning Objective(s) A. The student knows the least common multiple (l.c.m.) of two or more numbers is the smallest of the common multiples of the numbers. B. The student is able to find the l.c.m. of two or more numbers:

8 = 2 2 2   l.c.m. = 2 2 2 3
6 = 2 3   = 24

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Multiples, Multiples
Group Size: entire class or small groups
Materials: multiples chart, strips of paper and pencils

Procedure(s):

- Give students a copy of the chart and ask them to cover all the multiples of two. Check to see if they are correct.
- Ask students to cover the multiples of three. Check to see if they are correct.
- Ask the students which numbers were covered in both cases.
- Have the students make a list of the common multiples of 2 and 3.
- Have the students circle the least common multiple of 2 and 3.
- Repeat this process for multiples of 5 and 7.
- Have students make lists of common multiples of 2 and 5; 3 and 5; 2 and 7; 3 and 7; 5 and 7; 2, 3 and 5; and 2, 5 and 7. In all of these combinations have students circle the least common multiple (L.C.M.).

Examples of Chart:

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72
73	74	75	76	77	78
79	80	81	82	83	84
85	86	87	88	89	90
91	92	93	94	95	96
97	98	99	100		

Suggested Monitoring Procedures

Give students a list of some common multiples of two numbers and have them circle the least common multiple.

i.e. 2: 4, 6, 8, 10, 12, 14, 16, 18 .....
3: 6, 9, 12, 15, 18, 21, 24, 27,.....

Possible Resources

District adopted text.

SEA MATH: Seattle Mathematics Program: K-6
Seattle School District
815 Fourth North
Seattle, Wn. 98109
1975.

District Resources

Suggested Activities: Grade(s) ______

Title: Buzz
Group Size: entire class
Materials:

Procedure(s):

- A number whose multiples are to be learned is picked.
- The students then count by ones around the room.
- When a multiple of the original number comes up, that student says, "Buzz.
- Keep counting till 100.

Example:
Multiples of 4
1, 2, 3, Buzz, 5, 6, 7, Buzz, 9, 10, 11, Buzz.

Variations:

- The game can be played as row competition, each row racing against the clock (or each other) to get to 100.
- For advanced-ability students two numbers could be picked.
- Students "Buzz" when multiples of either numbers turn up.
- Also, the direction of flow can be reversed at each "Buzz.

409

Suggested Monitoring Procedures

Possible Resources

SEA MATH: Seattle Mathematics Program: K-6
Seattle School District
815 Fourth North
Seattle, Wn. 98109
1975

District Resources

410

Suggested Objective Placement 6-8

State Goal	1
District Goal	
Program Goal	2,3,6,7

Student Learning Objective(s) A. The student knows there are divisibility tests for 2,3,4...10 (except 7) and they can be used to help factor. B. The student is able to do a prime factorization of a number. C. The student is able to use divisibility tests for 2,3 and 5 as an aid in finding the prime factorization.

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Factor Rummy
Group Size: groups of 4-5
Materials: 60-80 cards numbered from 2-200 (or higher depending on the ability level), dice

Procedure(s):

- All the cards are dealt.
- The dice are rolled.
- Each player plays only one card face down that is a multiple of the number showing on the dice.
- If the number 10 shows on the dice, let that be considered the opportunity to lay down any prime number a player might have.
- When everyone has played, the cards are turned over and examined.
- If anyone plays an incorrect card, he/she must take all those cards from that round into his/her hand.
- If more than one person plays an incorrect card, they divide the cards.
- If no one makes a mistake, the cards go into a discard pile and are not used during the rest of the game.
- A player is not penalized for not playing during a round.
- When the round is completed, the dice are rolled again and the procedure repeated.
- The winner is whoever can get rid of all his/her cards.

Suggested Monitoring Procedures

Observe progress of game.

Possible Resources

District adopted text.

District Resources

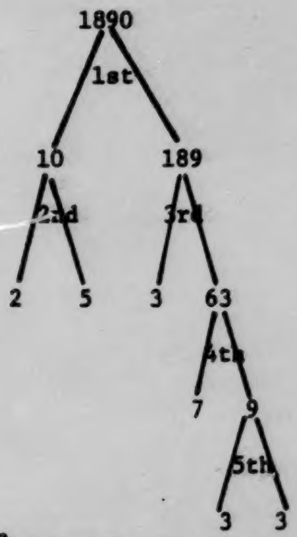
Suggested Activities: Grade(s) 6	Suggested Monitoring Procedures	Possible Resources

Title: Prime Factorization
Group Size: entire class
Materials: pencil, paper

Procedure(s):

- Each row is a team.
- The teacher gives a large number to the class.
- The first person in each row completes the first step in a factor tree and passes the paper back to the next person.
- The second person completes another step in the factor tree and passes the paper back.
- The paper is passed back with each person completing only one step in the factor tree until the prime factorization is found.
- If the prime factorization isn't found by the end of the row, or if a team member or teacher finds a mistake, the paper should go back to the first person to start the problem again.
- When the prime factorization is found, that person puts the whole factor tree on the board, and that row wins that round.

Example:



$1890 = 2 \times 3^3 \times 5 \times 7$

413

District Resources

414

SUBJECT: **Mathematics**

SPECIFIC AREA: **Numeration: Scientific Notation -- Exponents**

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. exponential form is an expression of the form M^b.	207	6-8					
. M^b means M as a factor b times ($5^4 = 5 \cdot 5 \cdot 5 \cdot 5$).	207	6-8					
. in M^b, M is the base and b is the exponent.	207	6-8					
. expressing a number in scientific notation is writing it as a number between 1 and 10 multiplied by a power of 10, i.e., $251 - 2.51 \times 10^2$.	211	7-8					
. M^{-b} means $\frac{1}{M}$ (the inverse M^b), i.e., $10^{-2} = \frac{1}{10}2$.	207	8					
. $M^x \cdot M^y = M^{x+y}$ ($3^2 \cdot 3^4 = 3^6$).	207	8					
. $M^x \div M^y - M^{x-y}$ ($2^6 \div 2^4 = 2^2$)	207	8					
The student is able to:							
* . evaluate an exponential expression, i.e., $2^3 = 2 \cdot 2 \cdot 2 = 8$.	207	6-8					
. name a decimal number including negative exponents in scientific notation: $358 = 3.58 \times 10^2$ $.00012 - 1.2 \times 10^{-4}$.		7-8					
. name a number, including negative exponents in scientific notation in decimal form: $2.65 \times 10^3 = 2650$. $6.5 \times 10^{-3} = .0065$	211	7-8					
The student values:							
. scientific notation as a simplified expression of very large or very small numbers.	211	6-8					

415

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ______________

416 417

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows exponential form is an expression of the form M^b. B. M^b means M as a factor b times ($5^4 = 5\cdot5\cdot5\cdot5$). C. The student knows in M^b, M is the base and b is the exponent. D. The student knows M^{-b} means $\frac{1}{M^b}$ (the inverse M^b), i.e., $10^{-2} = \frac{1}{10^2}$. E. The student knows $M^x M^y = M^{x+y}$ ($3^2 3^4 = 3^6$) F. The student knows $M^x \div M^y - M^{x-y}$ ($2^6 \div 2^4 = 2^2$). G. The student is able to evaluate an exponential expression, i.e., $2^3 = 2\cdot2\cdot2 = 8$.

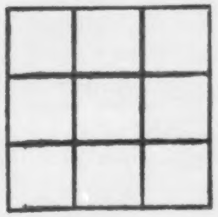
State Goal	1,8
District Goal	
Program Goal	2,3,7

Suggested Activities: Grade(s) 6

Title: Exponents: A First Step
Group Size: entire class
Materials: square regions to identify in three ways

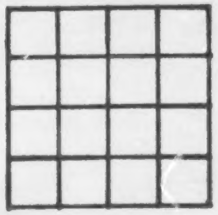
Procedure(s):

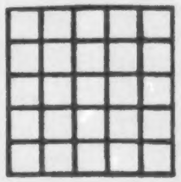
- Examine this square region and ask:

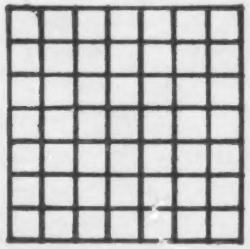


a. How many smaller regions are in the large square region? (9)
b. What are the factors this picture illustrates? (3x3)
C. Write the name for the number of smaller regions in the large square region using exponents. (3^2)

- Now write the whole number name, factor name and the numeral name using exponents for the following illustrations of square regions:







- Draw a diagram to illustrate: 2^2 and 8^2.
- Two problems for experts:
  1. Illustrate 2^3 (you may have to use more than one figure).
  2. Illustrate

418

Suggested Monitoring Procedures

Teacher observation

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) 6

Suggested Monitoring Procedures

Possible Resources

Title: Matching Number Names

Group Size: small group demonstration for entire class

Materials: cards with equivalent names for groups of numbers on them, string

Procedure(s):

- Group of 3-4 students write out different numbers and ways of expressing them on cards (see example).
- Group places cards on bulletin board, then asks volunteer from the class to connect equivalent values with piece of string.

Example:

1 million	100,000	10^6
10,000	10^5	1,000,000
10^4	10x10x10x10	10^4

District Resources

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows exponential form is an expression of the form M^b. B. M^b means M as a factor b times ($5^4 = 5 \cdot 5 \cdot 5 \cdot 5$). C. The student knows in M^b, M is the base and b is the exponent. D. The student knows M^{-b} means $\frac{1}{M^b}$ (the inverse M^b), i.e., $10^{-2} = \frac{1}{10^2}$. E. The student knows $M^x M^y = M^{x+y}$ ($3^2 \cdot 3^4 = 3^6$). F. The student knows $M^x \div M^y = M^{x-y}$ ($2^6 \div 2^4 = 2^2$). G. The student is able to evaluate an exponential expression, i.e., $2^3 = 2 \cdot 2 \cdot 2 = 8$

State Goal	1
District Goal	
Program Goal	2,3

Suggested Activities: Grade(s) 6

Title: Concentration: Using Exponents
Group Size: partners
Materials: concentration gameboard with 16 squares

Procedure(s):

- 16 squares to cover the squares on the gameboard, 8 of one color and 8 of another color.
- On 8 of the cards write numerals, using exponents.

Example:

5^2	2^3	4^2	3^3	6^1	10^2	2^5	9^2

- On 8 of the cards write numerals naming whole numbers, where each numeral is equivalent to a numeral using exponents.

Example:

25	8	16	27	6	100	32	81

- Place all the cards face down on the gameboard so that neither player knows which card is which.
- The first player turns up two cards, one of each color.
- If the player turns up a matching pair, he/she keeps these cards and takes another turn.
- If a matching pair is not turned up, the cards are turned face down in their original position after giving the other player a chance to see them.
- The next player turns up two cards and play continues as before.
- When all the cards have been taken, the player with the most cards wins.

Suggested Monitoring Procedures

Teacher observation

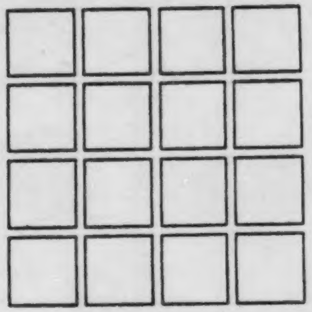
Possible Resources

District adopted text

District Resources

Suggested Activities: Grade(s) ______

CONCENTRATION



Game Board

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows expressing a number in scientific notation is writing it as a number between 1 and 10 multiplied by a power of 10, i.e., $251=2.51\times10^2$. B. The student is able to name a number, including negative exponents in scientific notation in decimal form:

$2.65\times10^3 = 2650.$

$6.5\times10^{-3} = .0065$ C. The student values scientific notation as a simplified expression of very large or very small numbers.

State Goal	1,10
District Goal	
Program Goal	2,3,8

Suggested Activities: Grade(s) 6

Title: Tic-Tac-Toe
Group Size: pairs
Materials: 9 numbers on cards that are to be written in scientific notation, an answer key

Procedure(s):

- The 9 problem cards are placed face down to correspond to the spaces on a Tic-Tac-Toe board.
- The players decide where they would like to place their "X" or "O".
- Players play in turn and attempt to answer the problem for the space they have chosen.
- The first student to get three answers correct in a row, column or diagonal
- Sample gameboard with cards placed face down. Write each in scientific notation:

8,000,000	.00032	.002
.0169	.000000123	412,000
700	213,000,000	3940

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Geometry

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. the positional terms, i.e., left, right, top, bottom, in front of behind, below, next to, on, above, middle, between, inside and outside.		K-1					
. the term "line segment" refers to part of a line and has two endpoints.		2-3					
. a line segment is named by its endpoints.		2-3					
. a pentagon is a closed shape with five sides.		3					
. a hexagon is a closed shape with six sides.		3					
. an octagon is a closed shape with eight sides.		3					
. the radius is a line segment from the center of a circle to a point on the circle.	215	3-4					
. the diameter is a line segment that goes from one side of a circle to another and passes through the center.	215	3-4					
The student is able to:							
*. identify geometric shapes: square, circle, triangle and rectangle.		K					
*. locate positions, i.e., left, right, top, bottom, in front of, behind, below, next to, on, above, middle, inside and outside.		K-1					
*. identify congruent shapes, i.e., circles, squares, rectangles, triangles.		K-1					
. identify the left side and right side of objects.		K-1					
. use a straightedge to draw line segments to form recognizable shapes: square, rectangle and triangle.		2-3					
. name a line segment by its endpoints.		2-3					
. identify an angle.		2-3					
. put a radius or diameter on a circle.	215	3-4					
The student values:							

430

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREIR EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ____________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-4

Student Learning Objective(s) A. The student knows the radius is a line segment from the center of a circle to a point on the circle. B. The student knows the diameter is a line segment that goes from one side of a circle to another and passes through the center. C. The student is able to put a radius or diameter on a circle.

Related Area(s)

State Goal	1,8
District Goal	
Program Goal	1,2,4

Suggested Activities: Grade(s) 4

Suggested Monitoring Procedures

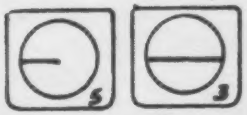
Possible Resources

District Resources

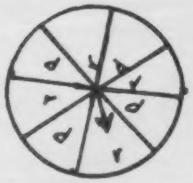
Title: Winning Circle
Group Size: two to six
Materials: game board, game cards, spinner, different colored markers

Procedure(s):

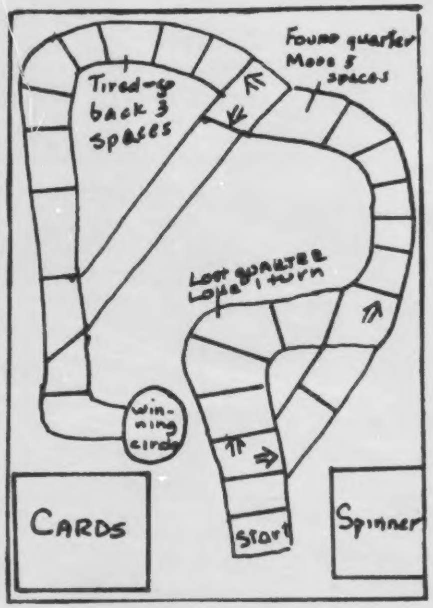
- Prepare twenty game cards by drawing a circle on each. In ten circles draw a radius and in the other ten draw a diameter. Write a number (from one to five) in the corner of each card.
- Prepare a game board and spinner as shown
- Students, in turn, draw a game card.
- Student then spins spinner. If it stops on the same line segment that is indicated on his/her card then student moves the number indicated in the corner, i.e., student draws a card with a radius and the number five and spinner lands on radius; student moves ahead five spaces.
- If the line segment indicated on the spinner and card are different, then student loses turn, i.e., student draws card with a radius and spinner lands on diameter; student loses turn.
- Student must land on the space at the start of the short cut in order to take it the next turn.
- First student to reach winning circle wins.



Game Cards



r= radius
d= diameter



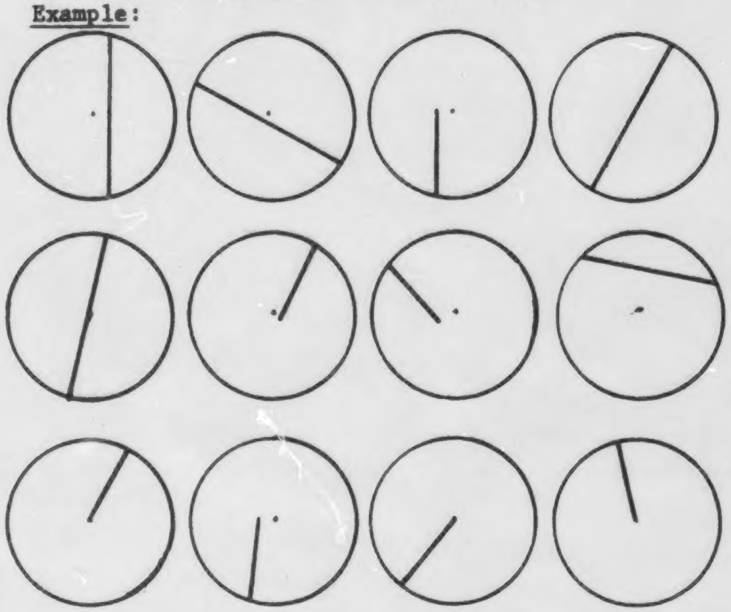
Suggested Activities: Grade(s) 4

Title: Choose the Radius or Diameter
Group Size: small group, entire class
Materials: paper, pencil, worksheet, crayons

Procedure(s):

- Prepare a worksheet with the following activities:
- Have the students color the circles green that have a line in them that is a radius.
- Have students color the circles red that have lines showing a diameter.
- Have the students correct the circles with misplaced diameters and radii with a blue crayon.

Example:



Suggested Monitoring Procedures

Possible Resources

Geometric Figures, Topic 61
Wisconsin Research and Developmen
Center for Cognitive Learning,
Rand McNally & Co.

District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Geometry: Shapes (Two-Dimensional)

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8
The student knows:							
. a rectangle has four right angles (square corners, perpendicular lines) and opposite sides are congruent.	219	4-6					
. a square is a special rectangle with four equal (congruent) sides.	219	4-6					
. a parallelogram is a four sided figure with opposite sides equal.	221	4-6					
. a rectangle is a parallelogram with four right angles, or four 90° angles.	223	6-8					
. a parallelogram is a quadrilateral with opposite sides equal and parallel.	223	6-8					
. a quadrilateral is a four-sided polygon.	227	7-8					
. a trapezoid is a quadrilateral with one pair of parallel sides.	227	7-8					
. a rhombus is a parallelogram with four congruent sides.	227	8					
. a congruence means a point-to-point fit.	229	7-8					
. a polygon is a closed figure made up of straight line segments.		7-8					
The student is able to:							
*. identify two-dimensional figures: rectangle, parallelogram.	217	4-5					
. identify two-dimensional figures: quadrilateral, trapezoid, rhombus.	227	5-8					
. identify and name congruent, two-dimensional shapes.	229	5-7					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ________________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows a rectangle has four right angles (square corners, perpendicular lines) and opposite sides are congruent. B. The student knows a square is a special rectangle with four equal (congruent) sides. C. The student is able to identify two-dimensional figures: rectangle, parallelogram.

State Goal	1
District Goal	
Program Goal	2,4

Related Area(s) ______

Suggested Activities: Grade(s) 4-6

Title: Geometric Scramble
Group Size: entire class
Materials: worksheet of scrambled terms with definitions below

Procedure(s):

- . Students are to unscramble the words on the worksheet and put each letter on a space. Then they are to look below for the definition that fits.
- . Students place the number of the definition in the circle before each unscrambled word.

Example:

③ right angle tgihr gealn
○ _ _ _ _ _ _ esuarq
○ _ _ _ _ _ _ _ _ _ _ _ _ _ mlaparaloelrg

1 is a special rectangle with four congruent sides.
2 is a four-sided figure with opposite sides.
3 is a 90° angle (square corner).

Note: Teacher could include terms from more than this set of objectives.

Title: Geometric Art
Group Size: entire class
Materials: drawing paper, felt pens, crayons, etc.

Procedure(s):

- . Teacher draws the geometric shape with a felt pen on the drawing paper. (rectangle, square)

Suggested Monitoring Procedures

Teacher need only correct the numbers in the circles.

Possible Resources

District Resources

Suggested Activities: Grade(s) ______

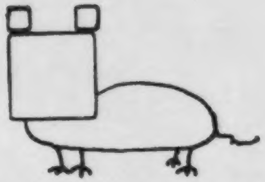
Suggested Monitoring Procedures

Possible Resources

- Students incorporate the geometric shape into their own creative character.
- Students name their creature characters by incorporating the name of the geometric shape they used.

Example:

SQUAREITIS



Title: Build a Figure
Group Size: entire class
Materials: plastic drinking straws, straight pins, clay (as a foothold or base to hold straws erect)

Procedure(s):

- Students can build the following two-dimensional figures:
  - the tallest rectangle they can
  - build the tallest square they can
- Figures could also be built of toothpicks and clay (or small marshmallows).

Variation:

- Students can play the riddle game--"Who Am I?" using objects in the room.

Example:

I am a large green object with four right angles and four straight lines. What am I?
Answer: Chalkboard

District Resources

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows a parallelogram is a four-sided figure with opposite sides equal. B. The student is able to identify two-dimensional figures: rectangle, parallelogram.

State Goal	1,4
District Goal	
Program Goal	2,4

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Build a Figure
Group Size: entire class
Materials: plastic drinking straws, straight pins, clay (as foothold or base to hold straws erect)

Procedure(s):

- Students can build the following two-dimensional figures:
  - the tallest rectangle they can
  - the tallest parallelogram they can
- Figures could also be built of toothpicks and clay or small marshmallows.

Variation:
Students can play the riddle game--"What Am I?" using objects in the room.

Example:
I am a large green object with four right angles and four straight lines. What am I?
Answer: Chalkboard

Title: Geometric Art
Group Size: entire class
Materials: drawing paper, felt pens, crayons, etc.

Procedure(s):

- Teacher draws a geometric shape with a felt pen on the drawing paper. (rectangle, parallelogram)

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) ______

- Students incorporate the geometric shape into their own creative character.
- Students name their creature characters by incorporating the name of the geometric shape they used.

Example: PARALLELOGRAMIPSKY

Variation:
Include other geometric shapes.

Title: Geometric Scramble
Group Size: entire class
Materials: worksheet of scrambled terms with definitions below

Procedure(s):

- Students are to unscramble the words on the worksheet and put each letter on a space. Then look below for the definition that fits.
- Students place the number of the definition in the circle before each unscrambled word.

Example:

③ r i g h t a n g l e   tgihr gealn
○ _ _ _ _ _ _   esuarq
○ _ _ _ _ _ _ _ _ _ _ _ _ _   mlaparaloelrg

1 is a special rectangle with four congruent sides
2 is a four-sided figure with opposite sides.
3 is a 90° angle (square corner)

Note: Teacher could include terms from more than this set of objectives.

Suggested Monitoring Procedures

Teacher need only correct the numbers in the circles.

Possible Resources

District adopted text.

District Resources

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows a rectangle is a parallelogram with four right angles, or four 90° angles. B. The student knows a parallelogram is a quadrilateral with opposite sides equal and parallel.

State Goal	1
District Goal	
Program Goal	2,4

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Geometric Scramble
Group Size: entire class
Materials: worksheet of scrambled terms with definitions below

Procedure(s):

- Students are to unscramble the words on the worksheet and put each letter on a space. Then look below for the definition that fits.
- Students place the number of the definition in the circle before each unscrambled word.

Example:

③ r i g h t a n g l e tgihr gealn

○ _ _ _ _ _ _ esuarq

○ _ _ _ _ _ _ _ _ _ _ _ _ _ mlaparaloelrg

1 is a special rectangle with four congruent sides.
2 is a four-sided figure with opposite sides.
3 is a 90° angle (square corner).

Note: Teacher could include terms from more than this set of objectives.

Suggested Monitoring Procedures

Teacher need only correct the numbers in the circles.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

Suggested Monitoring Procedures

Possible Resources

Title: Sentence Run Around
Group Size: entire class
Materials: worksheet of geometric terms with their definitions

Procedure(s):

- Give students a worksheet with sentences scrambled (words out of order).
- Students unscramble the sentences and write them correctly.

Example:

(scrambled) is polygon a sided
a four quadrilateral

(unscrambled) a quadrilateral is a
four-sided polygon.

Title: Build a Figure
Group Size: entire class
Materials: plastic drinking straws, straight pins, clay (as a foothold or base to hold straws erect)

Procedure(s):

- Students can build the following two-dimensional figures:
  - the tallest rectangle they can
  - the tallest parallelogram they can
  - the tallest quadrilateral they can
- Figures could also be built of toothpicks and clay.

Variation:

- Students can play the riddle game--"Who Am I?" using objects in the room.

Example:

I am a large green object with four right angles and four straight lines. What am I?
Answer: Chalkboard

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows a rectangle is a parallelogram with four right angles, or four 90° angles. B. The student knows a parallelogram is a quadrilateral with opposite sides equal and parallel.

State Goal	1
District Goal	
Program Goal	2,4

Related Area(s)

Suggested Activities: Grade(s) 6	Suggested Monitoring Procedures	Possible Resources
		District adopted text.

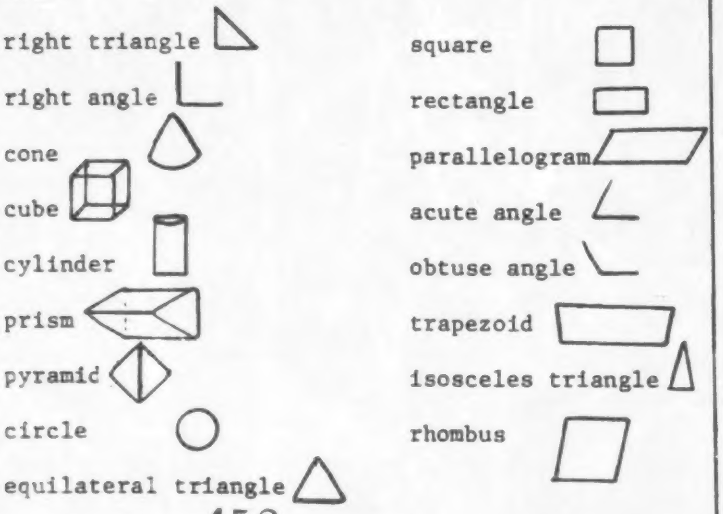
Title: Bingo Geometry

Group Size: entire class

Materials: worksheet of Bingo card, beans for markers

Procedure(s):

- Have students draw shapes of geometric figures randomly on the Bingo card (rectangle, parallelogram).
- Teacher "calls out" the description of a geometric figure. Student covers the figure with a bean if he/she has it on his/her card.
- Student covering row vertically or horizontally first wins.
- Some words and shapes that can be used in the game are:


right triangle
right angle
cone
cube
cylinder
prism
pyramid
circle
equilateral triangle
square
rectangle
parallelogram
acute angle
obtuse angle
trapezoid
isosceles triangle
rhombus

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

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Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student knows a quadrilateral is a four-sided polygon. B. The student knows a trapezoid is a quadrilateral with one pair of parallel sides. C. The student knows a rhombus is a parallelogram with four congruent sides. D. The student is able to identify two-dimensional figures: quadrilateral, trapezoid, rhombus.

State Goal	1
District Goal	
Program Goal	2,4

Related Area(s)

Suggested Activities: Grade(s) 5-6

Suggested Monitoring Procedures

Possible Resources

Title: Sentence Run Around
Group Size: entire class
Materials: worksheet of geometric terms with their definition

Procedure(s):

- Students are given a worksheet with scrambled sentences (words out of order).
- Students are to unscramble the sentences and write them correctly.

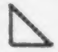
Example:

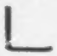
(scrambled)	is polygon a sided a four quadrilateral
(unscrambled)	A quadrilateral is a four-sided polygon.

Title: Bingo Geometry
Group Size: entire class
Materials: worksheet of Bingo cards, beans for markers

Procedure(s):

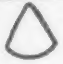
- Students draw shapes of geometric figures randomly on a Bingo card.
- The teacher reads the name of a geometric figure.
- If the students have that figure on the Bingo card, they cover the figure with a bean.
- Student covering a row vertically or horizontally first wins.
- Some words and shapes that can be used in the game are:

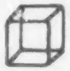
right triangle 
square

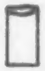
right angle 
rectangle

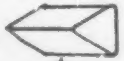
District Resources

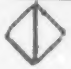
Suggested Activities: Grade(s) ______

cone 

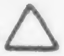
cube 

cylinder 

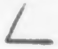
prism 

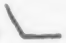
pyramid 

circle

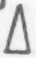
equilateral triangle 

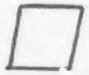
parallelogram

acute angle 

obtuse angle 

trapezoid

isosceles triangle 

rhombus 

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student knows a congruence means a point-to-point fit.

B. The student is able to identify and name congruent, two-dimensional shapes.

State Goal 1

District Goal

Program Goal 2,4

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Congruent Concentration

Group Size: two players

Materials: teacher-made cards of pairs of congruent shapes

Procedure(s):

- Cards are shuffled and placed face down (one by one) in neat rows.
- First player turns over any two cards he/she wishes. If player makes a match, he/she keeps that pair of cards and gets another turn. If player does not make a match, his/her turn is over and the second player has a turn.
- The player with the most "matches" is the winner.

Suggested Monitoring Procedures

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

402

403

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows a rectangle is a parallelogram with four right angles, or four 90° angles. B. The student knows a parallelogram is a quadrilateral with opposite sides equal and parallel.

State Goal	1
District Goal	
Program Goal	2,4

Related Area(s)

Suggested Activities: Grade(s) 7-8

Title: Geometric Scramble
Group Size: entire class
Materials: worksheet of scrambled terms with definitions below

Procedure(s):

- Students are to unscramble the words on the worksheet and put each letter on a space. Then look below for the definition that fits.
- Students place the number of the definition in the circle before each unscrambled word.

Example:

③ r i g h t a n g l e	tgihr gealn
○ _ _ _ _ _ _	esuarq
○ _ _ _ _ _ _ _ _ _ _ _ _ _	mlaparaloelrg

1 is a special rectangle with four congruent sides.
2 is a four-sided figure with opposite sides.
3 is a 90° angle (square corner)

Note: Teacher could include terms from more than this set of objectives.

Suggested Monitoring Procedures

Teacher need only correct the numbers in the circles.

Possible Resources

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

496

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SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student knows a quadrilateral is a four-sided polygon. B. The student knows a trapezoid is a quadrilateral with one pair of parallel sides. C. The student knows a rhombus is a parallelogram with four congruent sides. D. The student is able to identify two-dimensional figures: quadrilateral, trapezoid, rhombus.

State Goal	1
District Goal	
Program Goal	2,4

Related Area(s)

Suggested Activities: Grade(s) 7-8

Title: Sentence Run Around
Group Size: entire class
Materials: worksheet of geometric terms with their definitions

Procedure(s):

- Give students a worksheet with sentences scrambled (words out of order).
- Students unscramble the sentences and write them correctly.

Example:

(scrambled)	is polygon a sided a four quadrilateral
(unscrambled)	a quadrilateral is a four-sided polygon.

Title: Three-Dimensional Geo-Shape-O
Group Size: pairs
Materials: pencils, game cards

Procedure(s):

- Decide upon the shapes you want the students to identify. (There may be more than are given in the objectives above.)
- Draw a shape in each of the squares of each level. Shapes can be used more than once. Prepare game cards by writing the name of each shape on a card. Cards can be reused until completion of the game.

Example:

Rhombus

Game card

Suggested Monitoring Procedures

Teacher observation of the game.

Teacher-made test of shape and definition in a "matching" format.

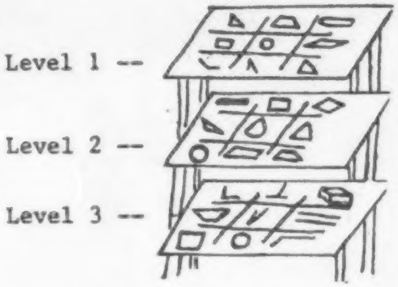
Possible Resources

District adopted text

District Resources

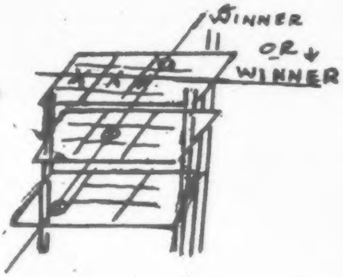
Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources

Example:

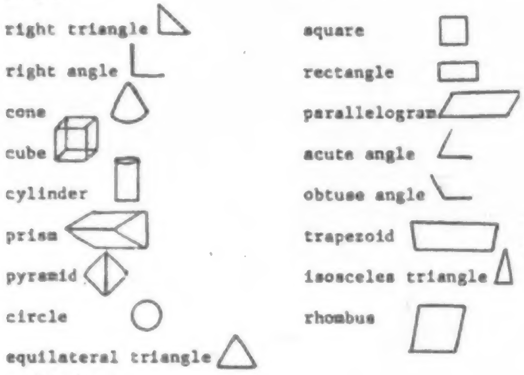

Level 1 --
Level 2 --
Level 3 --

- Shuffle game cards and place cards upside down on the table.
- The game begins when a player turns the top card over. He/she may place his/her mark (X or O) on either of the three levels on the shape given on the game card. That card is returned to the bottom of the stack. Second player takes his/her turn. A winner is determined by a player getting three marks in a row (just as in Tic-Tac-Toe). Winner may get his/her marks in a row, but on different levels (on a straight line segment).

Example:


WINNER
OR
WINNER

- Some words and shapes that can be used in the game are:


right triangle
right angle
cone
cube
cylinder
prism
pyramid
circle
equilateral triangle
square
rectangle
parallelogram
acute angle
obtuse angle
trapezoid
isosceles triangle
rhombus

Variation:

- Definitions of shapes can be used on game cards instead of names of shapes.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Geometry: Shapes (Three-Dimensional)

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8	
The student knows:								
. a die is a model of a cube.	237	4-6						
. a ball is a model of a sphere.	237	4-6						
. a can is a model of a cylinder.	239	4-6						
. the great pyramids of Egypt are models of a pyramid.	237	4-6						
. a sugar cone and a funnel without a spout are models of a cone.	237	4-6						
. a triangular prism is a three-dimensional figure with bases which are congruent triangles in parallel planes and lateral faces which are parallelograms.	239	7-8						
. a rectangular prism is a three-dimensional figure with bases which are congruent rectangles in parallel planes and lateral faces which are parallelograms.	239	7-8						
The student is able to:								
. identify three-dimensional figures: cube, sphere, pyramid, cone.	237	4-5						
. identify three-dimensional figures: cylinder, triangular prism, rectangular prism.	239	6-7						
The student values:								

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ______________

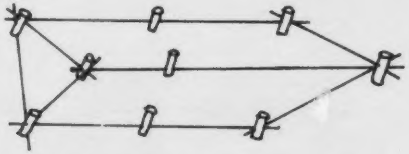
SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows a die is a model of a cube. B. The student knows a ball is a model of a sphere. C. The student knows the great pyramids of Egypt are models of a pyramid. D. The student knows a sugar cone and a funnel without a spout are models of a cone. E. The student is able to identify three-dimensional figures: cubes, sphere, pyramid, cone.

Related Area(s)

State Goal	1,4
District Goal	
Program Goal	1,2,4

Suggested Activities: Grade(s) 4-6	Suggested Monitoring Procedures	Possible Resources
Title: Toothpick Prisms Group Size: individual Materials: toothpicks, short pieces of soft plastic tubing 3/16", 1/4" long Procedure(s): . Use toothpicks to form edges of prisms. Push ends of toothpicks through wall of tubing to form intersections (corners). 	As each student completes a prism, ask him/her to draw a facsimile on paper and name it.	
Title: Sugar Cube Cubes Group Size: individual Materials: sugar cubes, glue Procedure(s): . Glue cubes together to form larger cubes or rectangular solids and prisms.	Identify shape.	District Resources
Title: Group Size: small groups Materials: opaque projector and magazine or newspaper pictures which contain the objected shapes, OR slide projector with slide photos, chalkboard or large paper, colored chalk or markers Procedure(s): . Focus projector on board or paper. . Student outline the objected shapes that approximate cones, spheres, pyramids, cubes, prisms, etc.	Monitor students during activity. Give the students a worksheet with samples of objects and have them label the objectives with the proper geometric figure (cube, sphere, pyramid, cone).	

Suggested Activities: Grade(s) 4-6

Title:
Group Size: individual
Materials: old catalogs, paste, markers, scissors

Procedure(s):

- Cut out pictures of objects such as ball, cones, pyramids, cubes and paste on paper.
- Outline target geometric shapes.
- Have students identify the object in the cut out picture and match it to the proper geometric shape.

Example:

Object	Geometric Shape
ice cream cone	cone
dice	cube
sugar cube	cube
funnel	cone
ball	sphere

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows a can is a model of a cylinder. B. The student knows a triangular prism is a three-dimensional figure with bases which are congruent triangles in parallel planes and lateral faces which are parallelograms. C. The student knows a rectangular prism is a three-dimensional figure with bases which are congruent rectangles in parallel planes and lateral faces which are parallelograms. D. The student is able to identify three-dimensional figures: cylinder, triangular prism, rectangular prism.

State Goal	1,4
District Goal	
Program Goal	1,2,4

Suggested Activities: Grade(s) 4-6

Title:
Group Size: individual, entire class
Materials: cardboard, glue, scissors, models of cylinders, triangular prisms, rectangular prisms

Procedure(s):
- Have students pass around and touch models of cylinders, triangular prisms, and rectangular prisms.
- Explain to students details of each model.
- Hand out cardboard, scissors and glue. Have students try to make models of cylinders, triangular prisms and rectangular prisms.
- Help students who need it.
- Display models made in room or school.

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) ____	Suggested Monitoring Procedures	Possible Resources
		District Resources

481

482

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Geometry: Points, Lines, Line Segments

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8
The student knows:							
• a point is an exact location in space.	255	4-8					
• a line segment is part of a line and has two endpoints.	245	4-8					
• a straight line is a set of infinite points on a plane having no endpoints.	255	4-8					
• intersecting lines are lines in the same plane that cross each other.	253	5-7					
• parallel lines are lines in the same plane which do not intersect.	249	5-7					
• perpendicular lines are two intersecting lines that form right angles.	249	5-7					
• a ray is a set of infinite points on a plane with one endpoint.	243	5-8					
• a plane is a set of points that can be connected with a line.		4-8					
The student is able to:							
• identify a point, a line, and a line segment.	255	4-5					
• identify a ray.	243	5-7					
• measure a line segment.	245	4-6					
• identify the following types of lines: intersecting, parallel, perpendicular.	253	5-7					
• bisect a line segment.	247	7-8					
• construct parallel and perpendicular lines.	249	7-8					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ____________

Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student knows a ray is a set of infinite points on a plane with one endpoint. B. The student is able to identify a ray.

State Goal	1
District Goal	
Program Goal	2,4,6

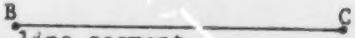
Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: A Ray
Group Size: entire class
Materials: overhead, chalkboard, worksheet

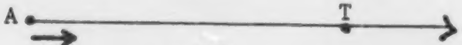
Procedure(s):

- Review with students the definition of a line segment: a line segment is part of a line. It has two endpoints. The endpoints can be used to name the line segment, i.e.,



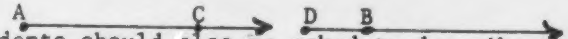
line segment __. $\overline{BC}$ or $\overline{CB}$

- Draw a line with one endpoint and point out that a ray is a part of a line with one endpoint and extends forever in one direction. To name a ray, name the endpoint first and then another point on the ray, i.e.,



$\overrightarrow{AT}$ ray AT

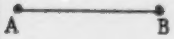
- Give students a worksheet with rays and ask them to identify the rays by letter, i.e.,



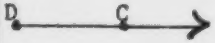
- Students should also be asked to describe the ray identified, i.e., ray with endpoint A and including point C.

Suggested Monitoring Procedures

Give students a worksheet with line segments and rays and ask them to identify both, i.e.,



(line segment)
$\overline{AB}$, $\overline{BA}$



ray $\overrightarrow{DC}$

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

489

488

SMALL SCHOOLS PROJECT

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows a line segment is part of a line and has two endpoints. B. The student is able to measure a line segment.

State Goal	1
District Goal	
Program Goal	2,4,6

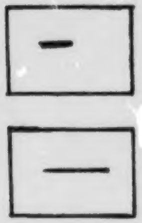
Related Area(s)

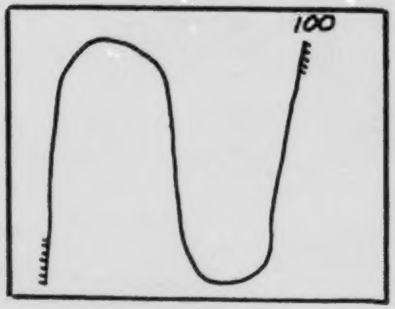
Suggested Activities: Grade(s) 4-6

Title: Metric or English Measure
Group Size: small group
Materials: game cards and board (see illustration), metric rulers, English rulers, markers for each student

Procedure(s):

- Use index cards with different lengths marked on them (either metric or English).
- Student draws from the shuffled stack of cards.
- Student uses ruler to measure the line segment drawn on each card.
- Student moves one space for each centimeter or inch measured.
- Place card back in the stack and shuffle after measuring.
- If student lands on an occupied space, he/she bumps that student, who then must go back to the start.





Use string one meter long to help lay out the game board (100 cm)

Suggested Monitoring Procedures

Possible Resources

District adopted text

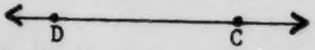
District Resources

Suggested Activities: Grade(s) ______

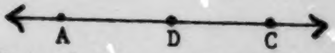
Title: Line Segments Around Us
Group Size: entire class
Materials: teacher's art file, magazines or drawings

Procedure(s):

- Teacher displays pictures of a city, buildings, schools, roads and bridges on a bulletin board.
- Using the chalkboard the teacher draws a dot to represent a point. In addition, he/she uses a straight edge and arrowheads to show that a line goes on forever in either direction. The line can be named using two capital letters.



- Several lines are drawn and named, and the definition of a line segment is stressed - a line segment is a part of a line. It has two endpoints and these can be used to name the line segment.
- Give students a worksheet with line segments and ask them to name the line segments, i.e.,

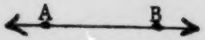


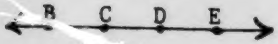
(AD, DC, AC, CA, DA, CD)

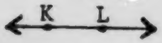
- After the segments are named, have students use a ruler and measure the segments.
- Review the definition of line segments and ask students to find line segments in the bulletin board display.

Suggested Monitoring Procedures

Give students a worksheet with line segments and a random list of measurements. Students are to identify a line segment with its correct measurement, i.e.,

1. 

2. 

3. 

a. 1"
b. 1/2". 1/2", 1/2"
c. 1-1/2"

Possible Resources

District adopted text

District Resources

SMALL SCHOOLS PROJECT

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows a line segment is part of a line and has two endpoints. B. The student is able to bisect a line segment.

State Goal 1

District Goal

Program Goal 2,4,6

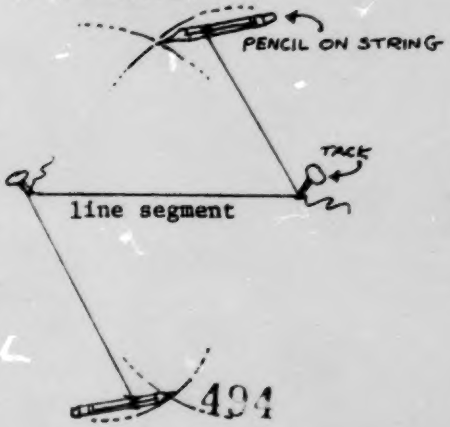
Related Area(s)

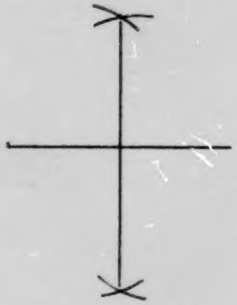
Suggested Activities: Grade(s) 4-6

Title: No Compass Bisecting
Group Size: individual
Materials: cardboard, pencil, string, thumb tacks

Procedure(s):

- Draw a line segment on the cardboard.
- Cut a piece of string which is more than half the length of the line segment.
- Tie the end of the string to the pencil and attach the other end of the string to the tack.
- Place tack in one end of segment and swing arc above and below line segment.
- Repeat process after you have put tack in other end of the segment.
- Connect the points where the arcs have crossed one another.
- Have students practice making line segment bisects on cardboard.





Suggested Monitoring Procedures

Observation of activity.

Possible Resources

District adopted text.

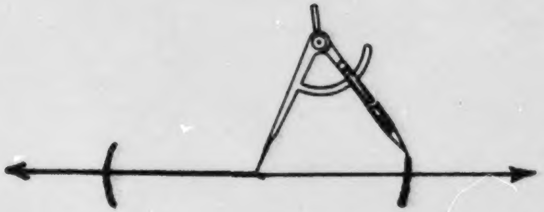
District Resources

Suggested Activities: Grade(s) _______

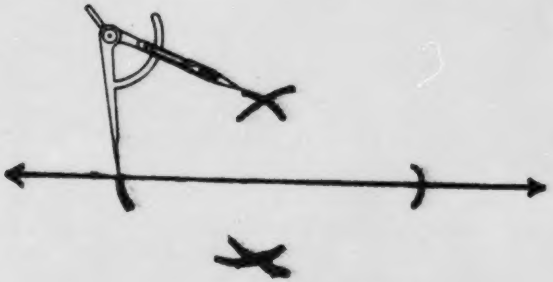
Title: Bisecting a Line
Group Size: entire class
Materials: compass, paper, pencil

Procedure(s):

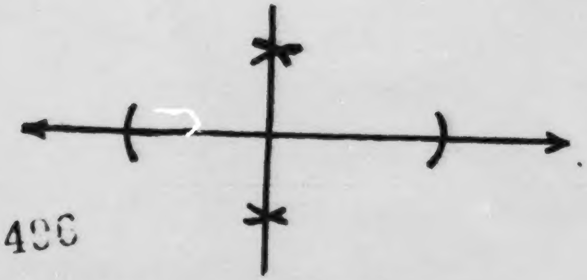
- Teacher demonstrates how to use a compass to bisect a line.



Step 1



Step 2



Step 3

Suggested Monitoring Procedures

Give students a worksheet with several line segments, and have them bisect them.

Possible Resources

District adopted text.

District Resources

SMALL SCHOOLS PROJECT

Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student knows parallel lines are lines in the same plane which do not intersect. B. The student knows perpendicular lines are two intersecting lines that form right angles. C. The student is able to construct parallel and perpendicular lines.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s) ___

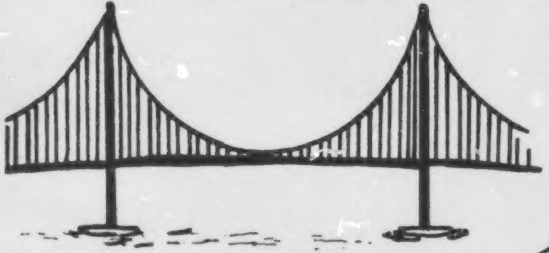
Suggested Activities: Grade(s) 5-6

Title: Geometric Search
Group Size: entire class
Materials: teacher art file, magazines or teacher's drawings (see illustrations)

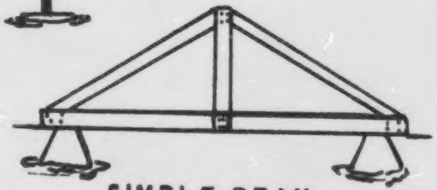
Procedure(s):

- Teacher tries to find a photo or photos (of scenery, city buildings, roads, etc.) that demonstrate the following: parallel lines, perpendicular lines, right angles, line segments, intersecting lines, and straight lines.
- Students find as many examples of geometric terms as possible from magazines or drawings.
- Give points to see who the winner is.

Variation: (lower grades)
Teacher-made pictures could be put on worksheet and parallel lines could be colored green; perpendicular lines, red; etc., by the students.



SUSPENSION



SIMPLE BEAM

Suggested Monitoring Procedures

Teacher notes student responses and makes necessary corrections.

Possible Resources

Aftermath, Creative Publications, Palo Alto, California

Magazines

District Resources

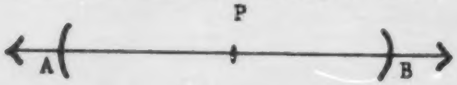
Suggested Activities: Grade(s) ______

Title: Parallel and Perpendicular
Group Size: entire class
Materials: overhead, chalkboard, compass and ruler

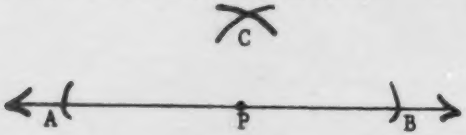
Procedure(s):

- Use the overhead or chalkboard to demonstrate how to construct a line perpendicular to another line.

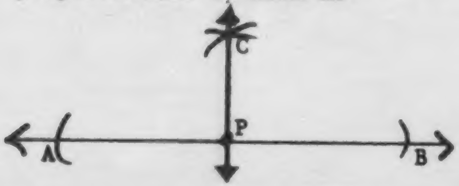
  Step 1 - With P as center, draw arcs intersecting the line at two points, A & B



  Step 2 - Then using B as a center, use a compass to draw arcs intersecting at C

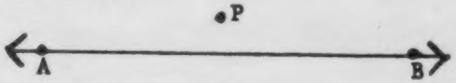


  Step 3 - Draw a line through P and C. Line PC is perpendicular to line AB



- Have students construct similar perpendicular models.
- Demonstrate on the overhead or chalkboard the construction of parallel lines.

  Step 1 - Draw a line segment A-B and a point not on the line



Suggested Monitoring Procedures

Have students construct parallel and perpendicular lines.

Possible Resources

District adopted text.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-8

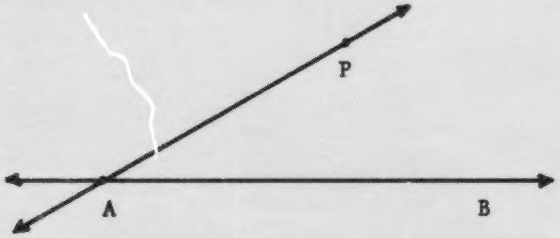
Student Learning Objective(s) A. The student knows parallel lines are lines in the same plane which do not intersect. B. The student knows perpendicular lines are two intersecting lines that form right angles. C. The student is able to construct parallel and perpendicular lines.

State Goal	1
District Goal	
Program Goal	2,4,6

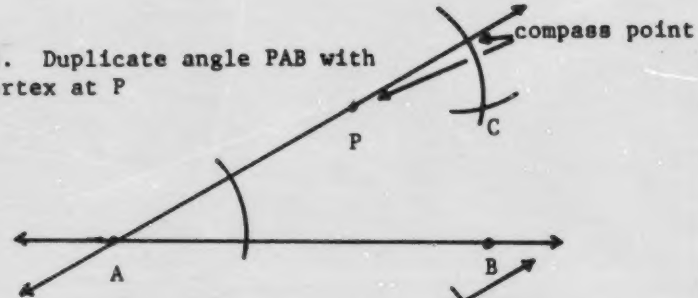
Related Area(s)

Suggested Activities: Grade(s) 5-6

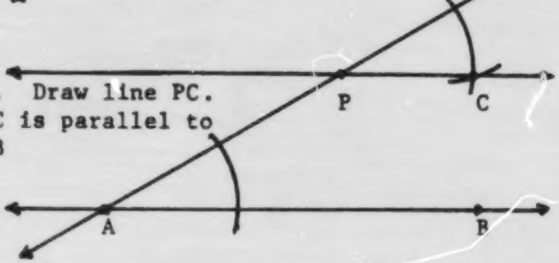
Step 2. Draw line AP



Step 3. Duplicate angle PAB with its vertex at P



Step 4. Draw line PC. Line PC is parallel to line AB



Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student knows intersecting lines are lines in the same plane that cross each other. B. The student knows parallel lines are lines in the same plane which do not intersect. C. The student knows perpendicular lines are two intersecting lines that form right angles.

D. The student is able to identify the following types of lines: intersecting, parallel, perpendicular.

Related Area(s)

State Goal	1
District Goal	
Program Goal	2,4,6

Suggested Activities: Grade(s) 5-6

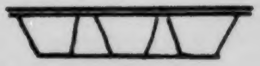
Title: Geometric Search
Group Size: entire class
Materials: teacher art file, magazines, or teacher's drawings (see illustration)

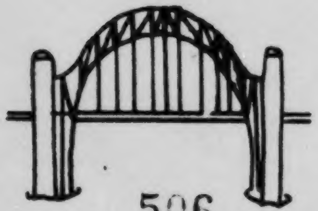
Procedure(s):

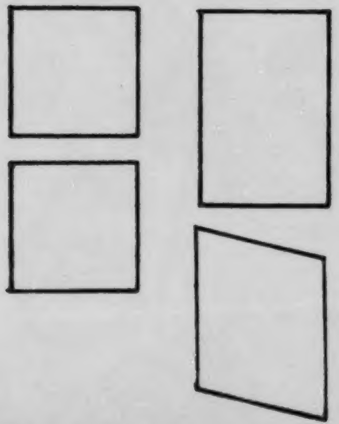
- Teacher tries to find a photo or photos (of scenery, city buildings, roads, etc.) that demonstrate the following: parallel lines, perpendicular lines, right angles, line segments, intersecting lines, points and straight lines.
- Students find as many examples of geometric terms as possible on paper or worksheet.
- Give points to see who the winner is.

Variation: (lower grades)

Teacher-made pictures could be put on worksheet and parallel lines could be colored green; perpendicular lines, red; etc.

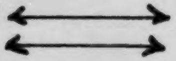


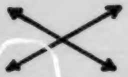


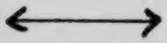


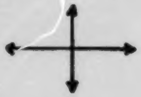
Suggested Monitoring Procedures

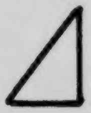
Give a post test with terms drawn on it. Student must give name of type of lines (terms) drawn, i.e.,

a.


b.


c.


d.


e.


Possible Resources

Aftermath, Creative Publications
Palo Alto, California

magazines

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows a point is an exact location in space. B. The student knows a line segment is part of a line and has two endpoints. C. The student knows a straight line is a set of infinite points on a plane having no endpoints. C. The student is able to identify a point, a line, and a line segment. E. The student is able to identify a ray.

Related Area(s)

State Goal	1
District Goal	
Program Goal	2,4,6

Suggested Activities: Grade(s) 4-6

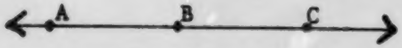
Title: Points, Lines, Line Segments and Rays

Group Size: entire class

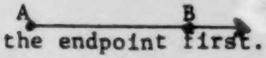
Materials: overhead, chalkboard, worksheet

Procedure(s):

- Explain that a point is an idea, therefore it has no dimension, width or thickness and cannot be seen. Put a dot on the overhead or chalkboard and suggest it will represent a point.
- Draw a line with arrows on each end and suggest that it is made up of an unlimited number of points, and goes on and on in both directions. A line is named by any two points in it, i.e.,



Thus it can be called line AB, line BC, line CB, line BA, or line CA.

- Suggest that a line segment has two endpoints, i.e., and is called $\overline{AB}$ or $\overline{BA}$.
- Draw a ray and explain that a ray has one endpoint, and extends forever in one direction, i.e.,  Ray $\overrightarrow{AB}$. It also is named with the endpoint first.
- Give students a worksheet and have them identify segments, rays, lines and points.

Example:

1. Fill in the chart with the letter names of the

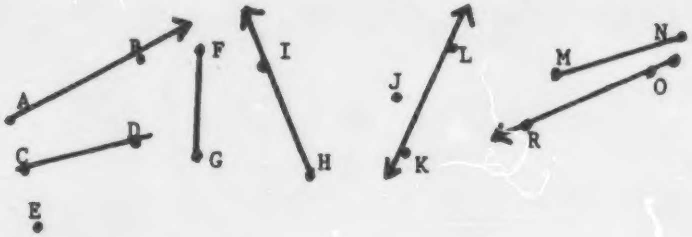
Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) ______

following rays, lines, points and segments.



Line Segments	
Rays	
Lines	
Points	

2. Draw and name:

4 lines, 4 line segments, 4 rays, 1 point

Suggested Monitoring Procedures

Possible Resources

District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Geometry: Angles, Triangles

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
Angles							
. an angle is the union of two rays with a common end point.	259	6-8					
. a right angle is 90°.	263	5-8					
. an acute angle is less than 90°.	263	5-8					
. an obtuse angle is more than 90°.	263	5-8					
. supplementary angles are two angles whose sum equals 180°.		7-8					
. complementary angles are two angles whose sum equals 90°.		7-8					
Triangles							
. a triangle is a polygon with three sides.	265	7-8					
. a triangle is a figure with three sides.	265	5-6					
. a right triangle has one right angle.	267	5-8					
. an acute triangle has three acute angles.	267	5-8					
. an obtuse triangle has one obtuse angle.	267	5-8					
. an equilateral triangle has three congruent sides.	271	5-8					
. an isosceles triangle has two congruent sides.	271	5-8					
. a scalene triangle has no congruent sides.	271	5-8					
The student is able to:							
* . identify congruent angles.	259	7-8					
. measure angles to the nearest degree: right, obtuse, acute.	257	7-8					
* . identify triangles (by angles) right triangle, acute triangle, obtuse triangle.	267	5-8					
. identify triangles (by sides) isosceles triangle, scalene triangle, equilateral triangle.	271	5-8					
. bisect any angle.	261	8+					
. identify equal angles.	261	6					
The student values:							

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OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ________

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows an angle is the union of two rays with a common end point. B. The student is able to identify congruent angles. C. The student is able to measure angles to the nearest degree: right, obtuse, acute.

State Goal	1, 4
District Goal	
Program Goal	2,4

Related Area(s)

Suggested Activities: Grade(s) 6

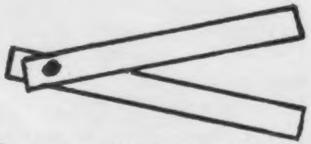
Title: What's Your Angle
Group Size: small groups (three each)
Materials: strips of tagboard, brass brad fasteners, protractors

Procedure(s):

- Illustrate on the chalkboard two intersecting rays with a common end point - identified as an angle to measure.
- Discuss and demonstrate how to read a protractor.
- Make angle sizers (directions below).
- Divide students into teams (three each).
- Teacher may act as referee at first, switching to students as they learn the game.

Directions for "What's Your Angle?"

- Make two angle sizers by punching a hole in the end of each tagboard strip and fastening them together in pairs.



- Play What's Your Angle? with three students.
- For each round of the game, one person will be the referee and the other two the players.
- The game is completed when three rounds have been played and each student has been the referee.
- The winner is the player with the greatest score.

To play a round:

- The referee gives a number of degrees between 0 and 180.

Suggested Monitoring Procedures

Teacher observation.

Possible Resources

SEAMATH, Seattle Public Schools, Administration and Service Center, 4th North, Seattle, WA 98109

District Resources

Suggested Activities: Grade(s) ______

- Each player opens his/her angle sizer to show an angle of that size.
- The referee uses a protractor to measure each angle. He/she determines if the angle formed with the angle sizer is congruent or equal to that shown on the protractor.
- A point is scored by the player whose angle is nearest to the right size.
- A round is completed after ten tries. The student with the most points after three rounds wins.

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Objective Placement 6-8+

Student Learning Objective(s) A. The student knows an angle is the union of two rays with a common endpoint. B. The student is able to bisect any angle.

State Goal	1
District Goal	
Program Goal	2,4,7

Related Area(s)

Suggested Activities: Grade(s) 6

Suggested Monitoring Procedures

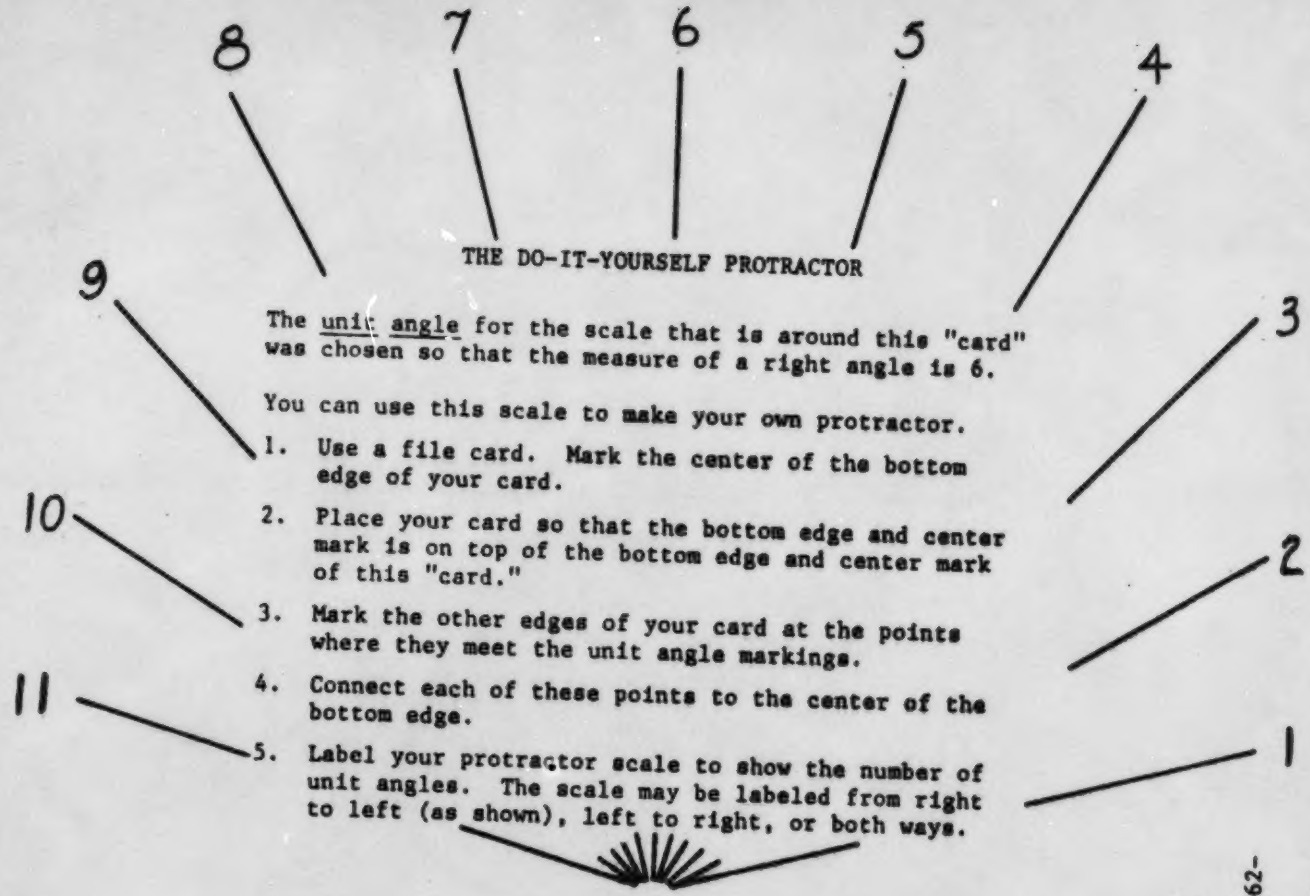
Possible Resources

Title: Angles and Rays
Group Size: individual, entire class
Materials: compass, straightedge, colored pencils

Procedure(s):

- . Time each student for the following activity. Put times on chalkboard. The fastest time is the winner.
- . Have students draw any four sided figure.
- . Have students pick any two angles of the above figure and label one angle (1) and the other angle (2).
- . Have students color the common end point: of angle (1) BLUE; of angle (2) GREEN.
- . Have the students color the two rays: of angle (1) RED; of angle (2) BLACK.
- . Have the students bisect: angle (1); angle (2).

District Resources



THE DO-IT-YOURSELF PROTRACTOR

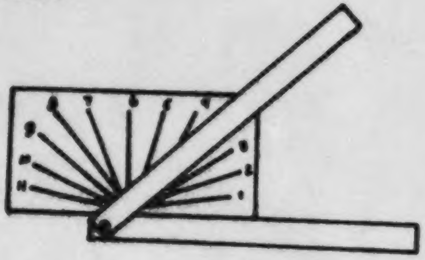
The unit angle for the scale that is around this "card" was chosen so that the measure of a right angle is 6.

You can use this scale to make your own protractor.

1. Use a file card. Mark the center of the bottom edge of your card.
2. Place your card so that the bottom edge and center mark is on top of the bottom edge and center mark of this "card."
3. Mark the other edges of your card at the points where they meet the unit angle markings.
4. Connect each of these points to the center of the bottom edge.
5. Label your protractor scale to show the number of unit angles. The scale may be labeled from right to left (as shown), left to right, or both ways.

Materials: two tagboard strips; brass fastener; paper punch; the "Do-it-Yourself" protractor.

1. Punch a small hole in one end of each strip. Attach them to each other with the fastener.
2. Spread the strips apart to make a right angle.
   Make angles that are larger than a right angle.
   Make angles that are smaller than right angles.
3. Make an angle that is larger than a right angle.
   Estimate the measure of the angle in your protractor units.
   Use your protractor to check the estimate.
4. Make other angles. Estimate and then measure in each case.



SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student knows a right angle is 90°. B. The student knows an acute angle is less than 90°. C. The student knows an obtuse angle is more than 90°.

State Goal	1,4
District Goal	
Program Goal	2,4

Related Area(s)

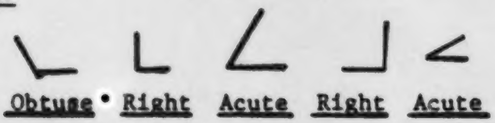
Suggested Activities: Grade(s) 5-6

Title: Matching
Group Size: entire class
Materials: worksheet

Procedure(s):

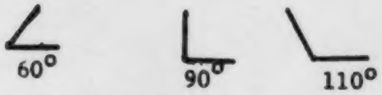
- Give students a worksheet with right, obtuse and acute angles drawn with a blank line under each one.
- Students are to identify each angle and write in whether the angle is an obtuse, acute or a right angle on the line below the angle.

Example:



- Ask students to approximate the number of degrees in the obtuse and acute angles and write in the approximation.

Example:



- Ask student to measure the angles to see how close they were in their approximations.

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) ____

Suggested Monitoring Procedures

Possible Resources

Title: Shapes
Group Size: entire class
Materials: old magazines, bulletin board, chart, scissors

Procedure(s):

- Teacher puts up bulletin board with the shapes right triangle, obtuse triangle, etc., outlined in heavy magic marker.
- Students cut objects out of old magazines that have the same shape as those outlined on the board.
- They then pin their pictures to the bulletin board and discuss the similarities.

Title: The Do-It-Yourself Protractor
Group Size: entire class
Materials: file cards, two tagboard strips, brass brad fasteners, paper punch, protractor (for each student)

Procedure(s):

- Have each student construct a protractor and angle measure. (See next page.)
- Illustrate acute, 90°, and obtuse angles on chalkboard and demonstrate how to check with the do-it-yourself protractor.
- Have students measure several examples of acute right, and obtuse angles.

SEAMATH, Seattle Public Schools
Seattle Public Schools
Administration and Service Cente
815 4th North, Seattle, WA 9810

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student knows a triangle is a polygon with three sides.

B. The student knows a triangle is a figure with three sides.

State Goal	1, 4
District Goal	
Program Goal	2, 4

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Common Triangles

Group Size: entire class

Materials: scissors, old magazines

Procedure(s):

- Students cut out all of the pictures they can find of things that are triangular in shape.
- Students can make a collage of pictures.
- Have students list five things seen daily that contain triangles, i.e., bridges, stairs, rooflines of houses, schools, churches, cars, barns.

- Compare lists by noting one thing that is on each person's list ,and noting one that is unique to a student's list.

Suggested Monitoring Procedures

Observation of collages and lists that students provide.

Possible Resources

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student knows a right triangle has one right angle. B. The student knows an acute triangle has three acute angles. C. The student knows an obtuse triangle has one obtuse angle. D. The student is able to identify triangles (by angles): right triangle, acute triangle, obtuse triangle.

Related Area(s)

State Goal	1, 4
District Goal	
Program Goal	2, 4

Suggested Activities: Grade(s) 5-6

Title: Tallyangle
Group Size: pairs
Materials: paper, pencil, ruler, protractor, small triangles of assorted shapes (right, acute, obtuse), one pint container

Procedure(s):

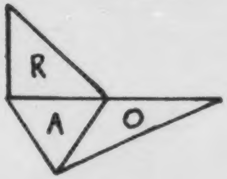
- Put the triangles into a container.
- Students, without looking at each other's triangles, choose three triangles from container.
- Students place the three triangles on paper to make a shape. Direct the students to put sides next to each other that are the same length.
- Students then carefully trace around each shape with a pencil.
- Each student carefully cuts out his/her shape.
- Students compare shape to chart to see how many points they have. The person with the most points wins.

Example:

Chart	Point
Shape with largest angle	3
Shape with smallest angle	2
Any right angle	1
Any obtuse angle	1
Shape with most corners	1

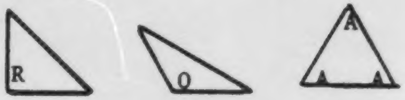
Sample Shape:

R - Right Triangle
A - Acute Triangle
O - Obtuse Triangle



Suggested Monitoring Procedures

Give students a worksheet with a number of right triangles, acute triangles and obtuse triangles. Have them label the angle or angles in each one with an A, R or O.



Suggested Resources

District Resources

Suggested Activities: Grade(s) ______

Title: Shapes
Group Size: entire class
Materials: old magazines, bulletin board, chart, scissors

Procedure(s):

- Teacher puts up a bulletin board with the shapes right triangle, obtuse triangle, etc., outlined in heavy magic marker.
- Students cut objects out of old magazines that have the same shape as those outlined on the board.
- They then pin their pictures to the bulletin board and discuss the similarities.

Suggested Monitoring Procedures

Suggested Resources

District Resources

SMALL SCHOOLS PROJECT

Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student knows a right triangle has one right angle. B. The student knows an acute triangle has three acute angles. C. The student knows an obtuse triangle has one right obtuse angle. D. The student is able to identify triangles (by angles) right triangle, acute triangle, obtuse triangle.

Related Area(s)

State Goal	1,4
District Goal	
Program Goal	2,4

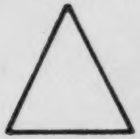
Suggested Activities: Grade(s) 5-6

Title: Identifying Triangles
Group Size: entire class
Materials: worksheet

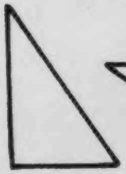
Procedure(s):

- Give students a worksheet with a number of triangles and ask them to label the kind of triangle represented.

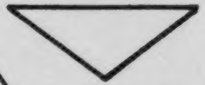
Example:



Acute



Right



Obtuse

(repeat in various positions and order)

- Have the students approximate the degrees in the angles (except for the right triangle).
- Have the students measure the degrees in the angle to check their approximations.

Suggested Monitoring Procedures

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
		District Resources

538

539

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Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student knows an equilateral triangle has three congruent sides. B. The student knows isosceles triangle has two congruent sides. C. The student knows a scalene triangle has no congruent sides. D. The student is able to identify triangles (by sides) isosceles triangle, scalene triangle, equilateral triangle.

Related Area(s)

State Goal	1,4
District Goal	
Program Goal	2,4

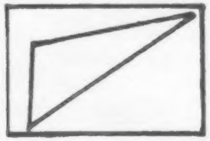
Suggested Activities: Grade(s) 5-6

Title: Know Your Triangles "Concentration"
Group Size: pairs
Materials: two sets of game cards

Procedure(s):

- Prepare two sets of game cards. One set has definitions and the other has illustrations of different kinds of triangles, i.e., equilateral, isosceles, scalene. All cards are numbered on the back.

Example:



no
congruent
sides

- Students lay cards face down (numbers up) on the desk and play "concentration" by matching definitions and illustrations.
- The student with the most sets of cards wins.

Suggested Monitoring Procedures

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

Suggested Monitoring Procedures

Possible Resources

Title: Shapes
Group Size: entire class
Materials: old magazines, bulletin board, chart, scissors

Procedure(s):

- Teacher puts up a bulletin board with the shapes (right triangle, obtuse triangle, etc.) outlined in heavy magic marker.
- Students cut objects out of old magazines that have the same shape as those outlined on the board.
- They can then pin their pictures to the bulletin board and discuss the similarities.

District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Geometry: Circles

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. a circle is the set of all points in the same plane equal distance from a given point.		4-6					
. the circumference of a circle is the same as the perimeter of a a circle.		6-8					
. a cord is a straight line within a circle whose endpoints touch the circumference.		8					
. the diameter of a circle is a line segment going through the center of a circle whose endpoints touch the circumference.	275	4-6					
. the radius is a line segment within a circle, one endpoint at the center, and the other endpoint on the circumference.	275	4-6					
. an arc is a portion of the circumference of a circle.		6-8					
The student is able to:							
* . locate properties of a circle: diameter, radius, center.	275	4-6					
* . locate properties of a circle: cord, arc, semicircle.		6-8					
* . construct a circle from a given radius or diameter.		6-8					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ______________

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows a circle is the set of all points in the same plane equal from a given point. B. The student knows the diameter of a circle is a line segment going through the center of a circle whose endpoints touch the circumference. C. The student knows the

Related Area(s) radius is a line segment within a circle, one endpoint at the center and the other end point on the circumference. D. The student is able to locate properties of a circle: diameter, radius, center.

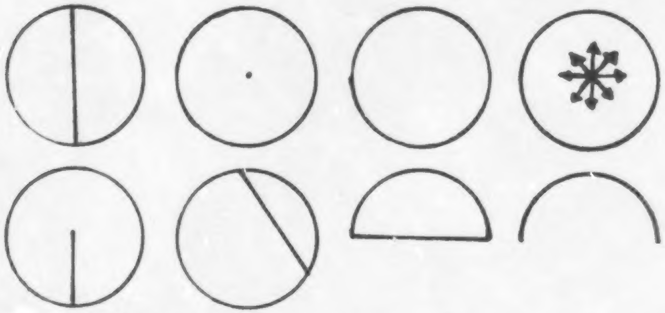
State Goal	1
District Goal	
Program Goal	2,4,8

Suggested Activities: Grade(s) 4-6	Suggested Monitoring Procedures	Possible Resources

Title: Circle Rummy
Group Size: two to three
Materials: deck of cards (see illustration) (four of each type)

Procedure(s):

- Student shuffles cards and deals five cards to each player (except person who starts game; he/she gets six). He/she discards one card.
- Object is to get books of three or four.
- Next person either takes discards or draws.



Title: Color the Parts
Group Size: entire class
Materials: worksheet with several examples of circumference, radius, cords, arcs, diameters, and circles, crayons.

Procedure(s):

- Students are asked, either by the teacher to the whole class, or by a job card, to color the: cords of a circle green, arcs red, circumference purple, etc. Since there are several examples on each worksheet, colors will be used more than once.

District Resources

Suggested Activities: Grade(s) 4-6	Suggested Monitoring Procedures	Possible Resources
		District Resources

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Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows the diameter of a circle is a line segment going through the center of a circle whose endpoints touch the circumference. B. The student knows the radius is a line segment within a circle, one endpoint at the center and the other endpoint on the circumference. C. The student is able to construct a circle from a given radius or diameter.

Related Area(s)

State Goal	1
District Goal	
Program Goal	2,4,8

Suggested Activities: Grade(s) 6

Title: Color the Parts
Group Size: entire class
Materials: worksheet with several examples of circumference, radius, cords, arcs, diameters and circles, crayons

Procedure(s):

- . Students are asked, either by the teacher to the whole class, or by a job card, to color the: cords of a circle green, arcs red, circumference purple, etc. Since there are several examples on each worksheet, colors will be used more than once.

Title: Circle Construction Diameter
Group Size: small group, entire class
Materials: ruler, compass, paper, worksheet with several diameters written on them

Procedure(s):

- . Teacher reviews bisecting lines and has students bisect one of the diameters together in class. The rest are done on student work time.
- . After bisecting line with compass, student puts compass point on mid-point and stretches it out to endpoint of line segment (diameter). Then he/she draws the complete circle.

Suggested Monitoring Procedures

Teacher observes student progress helps when necessary.

Possible Resources

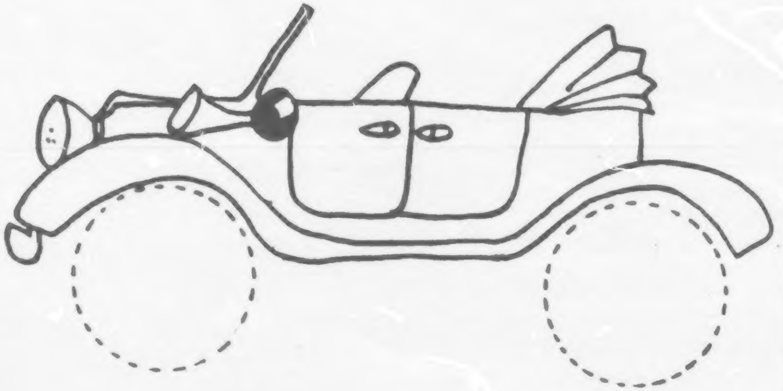
District Resources

Suggested Activities: Grade(s) 4

Title: Give It Wheels
Group Size: individual
Materials: worksheet

Procedure(s):

- Student is to supply wheels by using compass or string-thumbtack method for drawing circles. The spokes are the radii.



Suggested Monitoring Procedures

Possible Resources

District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Geometry: Perimeter

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. the perimeter of polygons is determined by adding together the lengths of all sides.	281	4-6					
. the circumference of a circle is found by multiplying the diameter times pi (C • d or C = 2 r).		7-8					
. a polygon is a closed figure made up of straight line segments.	281	7-8					
. pi is the relationship between the circumference and the diameter of a circle, or approximately 3.1416.		7-8					
The student is able to:							
*. determine the perimeter of polygons.	283	4-8					
. determine the circumference of a circle, given the diameter or radius.		7-8					
. determine the diameter or radius given the circumference.		7-8					
. determine the missing sides of a polygon, given the other sides and the perimeter.	281	7-8					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ____________

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Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows the perimeter of polygons is determined by adding together the lengths of all sides. B. The student knows a polygon is a closed figure made up of straight line segments. C. The student is able to determine the missing sides of a polygon, given the other sides and the perimeter.

Related Area(s)

State Goal	1
District Goal	
Program Goal	2,4,6

Suggested Activities: Grade(s) 4-6

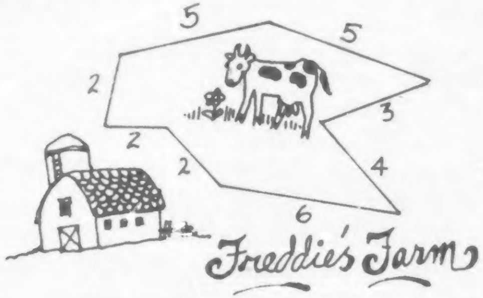
Title: Freddie's Fenced Farm

Group Size: pairs, small group (should be able to sit around a single table)

Materials: game cards with polygons of various shapes and perimeters 20-40 units, strips of colored paper of various lengths (two units, green; three units, red; four units, blue; five units, yellow) in a paper bag, stack of cards with number combinations

Procedure(s):

- Play starts with any player and proceeds clockwise around table.
- Player draws card, says product (sum).
- If correct (verified by other players) he/she draws one strip from paper bag without peeking.
- Player places strip on his/her card representing Freddie's Fence.
- Object of the game is to be the first to complete the fence and correctly determine the perimeter of his/her game card.



Suggested Monitoring Procedures

Worksheet of polygons with the students finding the perimeter when the length of each side is given.

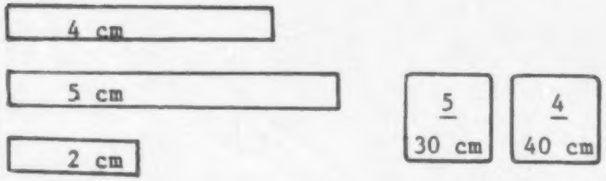
Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) 4-6

Title: Missing Side
Group Size: individual, small group
Materials: small strips of paper of various lengths with length written on the strip, cards giving number of sides and perimeter of desired figure.



Procedure(s):

- Have students draw a card at random.
- Have students draw at random a number of strips equal to one less than the number of sides for the given figure, i.e., three sides, draw two; five sides, draw four).
- Have students lay out figure using one strip for each side and determine the length of the remaining side.
- NOTE: If given perimeter is impossible, draw additional strips and combine with another to form longer side.

Suggested Monitoring Procedures

Assist students to identify impossible perimeters, i.e., if given perimeter is greater than or equal to twice the sum of lengths of the sides drawn.

Possible Resources

District adopted text.

District Resources

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows the perimeter of polygons is determined by adding together the lengths of all sides. B. The student is able to determine the perimeter of polygons.

State Goal	1
District Goal	
Program Goal	2,4,6

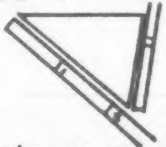
Related Area(s)

Suggested Activities: Grade(s) 4-6

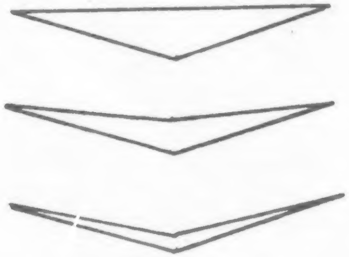
Title:
Group Size: entire class
Materials: rulers, worksheet of polygons

Procedure(s):

- Have students use rulers to add up the distance around the polygon, i.e., measure continuously on the ruler.



- Relate the continuous measurement by adding up the sides of the polygons to get the distance around or perimeter.
- Practice finding the perimeter of the remaining polygons on the worksheet.
- Have students compare the perimeter of the following types of polygons:



Suggested Monitoring Procedures

Teacher observation.
Worksheet of polygons with students finding the perimeter when given the length of all the sides.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) 4-6

Title: Demonstration
Group Size: entire class
Materials: colored chalk, string, chalkboard

Procedure(s):

- Draw a polygon on the chalkboard using a different color for each lateral.
- Ask different students to come up and cut a piece of string the same length as the blue line, red line, etc.
- Ask how much string was used. Students hold up their cut pieces in a line.
- Together write the number sentence on the board, i.e., blue line + red line, etc. = distance around the figure or perimeter.
- Then write in numbers on the laterals. Again write the number sentence.
- Draw other polygons with measurements. Ask volunteers to come to the chalkboard to determine perimeter.

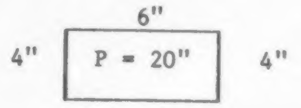
Title: What's the Perimeter?
Group Size: entire class
Materials: geoboards, rubber bands

Procedure(s):

- Pair up students, each pair having a geoboard and rubber bands.
- One of the pairs designs a shape on the geoboard. The other student works out the perimeter of the shape.

Suggested Monitoring Procedures

Give the students a worksheet with drawings of polygons showing the length of each side and have them compute the perimeter.
The first problem could be a polygon showing the length of three sides and the perimeter with the students uniting the lengths for determining the perimeter of a polygon, i.e.



Teacher observation.

Possible Resources

District adopted text.

District adopted text.

District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Geometry: Area: rectangles, triangles, circles

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. area is a two-dimensional surface.	287	6-8					
. area is measured in square units.	287	6-8					
. a square unit is represented by unit^2 (cm^2, dm^2).	287	6-8					
. the area of a rectangle is determined by multiplying the length times width ($A = lw$).	287	6-8					
. the area of a parallelogram is determined by multiplying the base times the height ($A = bh$).		6-8					
. the area of a triangle is determined by multiplying one-half the base times the height ($A = \frac{1}{2}bh$).	295	6-8					
. the area of a circle is determined by multiplying pi times radius squared ($A = \pi r^2$).		7-8					
The student is able to:							
* . compute the area of a rectangle given the length and width.	293	6-8					
. compute either the length or width of a rectangle given the area and one dimension.	287	7-8					
. compute the area of a parallelogram given the base and height.		6-8					
* . compute the area of a triangle given the base and height.		6-8					
. compute the height or base given the area and one dimension.		7-8					
* . compute the area of a circle given either the diameter or radius.		7-8					
. compute the radius or diameter of a circle given the area.		7-8					
The student values:							

500

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ______________

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Suggested Objective Placement 6-8

State Goal	1
District Goal	
Program Goal	2,4,6

Student Learning Objective(s) A. The student knows area is a two-dimensional surface. B. The student knows area is measured in square units. C. The student knows a square unit is represented by unit^2 (cm^2, dm^2). D. The student knows the area of a rectangle is determined by multiplying the length times width (A = lw). E. The student is able to compute either the length or width of a rectangle given the area and one dimension.

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Demonstration: What Is Area?
Group Size: individual, entire class
Materials: piece of string twenty inches long, cloth large enough to cover a student desk

Procedure(s):

- Give a student the piece of string and ask the student to cover his/her desk with it. Ask why the string won't do the job. (String only covers one dimension, linear measurement, or length.)
- Now give the student the cloth to cover the desk. Discuss the second dimension. (The cloth has two dimensions, length and width.) The surface covered by these two dimensions is called AREA.

Suggested Monitoring Procedures

Observation during the demonstration to note students mastering the concept easily and those having difficulty.

Give students a worksheet with problems involving the area of rectangles and have them solve the problems.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows area is measured in square units. B. The student knows a square unit is represented by unit^2 (cm^2, dm^2). C. The student knows the area of a rectangle is determined by multiplying the length times width ($A = lw$). D. The student is

Related Area(s) able to compute either the length or width of a rectangle given the area and one dimension.

State Goal	1
District Goal	
Program Goal	2,4,6

Suggested Activities: Grade(s) 6

Title: Area, Area
Group Size: individual, small group, entire class
Materials: scissors, pencil, paste, graph paper (preferably two contrasting colors)

Procedure(s):

- . Student receives a polygon drawn on graph paper.
- . Also he/she receives a rectangle or square which has the same area as the polygon.
- . Have students calculate area of the rectangle. Then cut the polygon on the lines into rectangles and squares. Fit and paste the pieces into the rectangle.
- . Have the students calculate the area of each piece and sum the areas, showing the total area is equal to the sum of the partial areas.
- . See diagrams on back of page.

Suggested Monitoring Procedures

Observation of students in the activity.

Give the students a worksheet with several problems on finding the area of a rectangle given the length and width. Vary the problems by giving the area and the length of some rectangles or area and the width of others.

Possible Resources

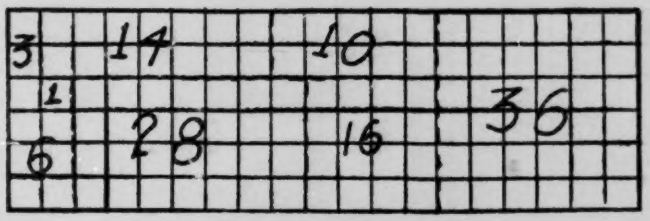
District adopted text.

District Resources

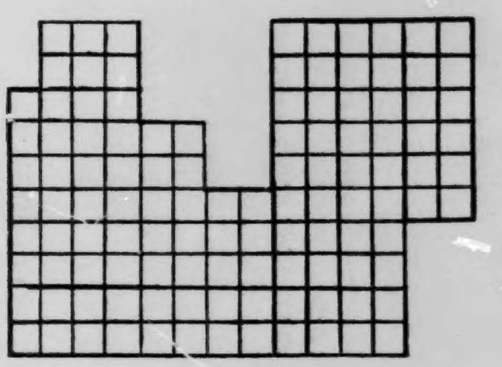
Suggested Activities: Grade(s) ______

Suggested Monitoring Procedures

Possible Resources



Rectangle of an area of 114 square units.



Polygon with area of 114 square units.

Variation:

- Start with rectangle and cut and paste to form a house plan, labeling rooms and area of each.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows area is measured in square units. B. The student knows a square unit is represented by unit^2 (cm^2, dm^2). C. The student knows the area of a rectangle is determined by multiplying the length times width (A = lw). D. The student is able to compute either the length or width of a rectangle given the area and one dimension.

State Goal	1
District Goal	
Program Goal	2,4

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Geoboard Area
Group Size: entire class
Materials: geoboards for one-half of the class, rubber bands

Procedure(s):

- Have students work in pairs. Give each pair a geoboard and rubber bands.
- One of the pairs sets up a rectangle on the geoboard for the other two to solve for area.
- Members of the pair alternate working with the geoboard.
- Students may also give problems:
  i.e., Area is 24 cm^2 and length is 6 cm; find the width.
  Area is 24 cm^2 and width is 4 cm; find the length.

Suggested Monitoring Procedures

Teacher observation during activity.

Worksheet with problems to solve involving the area of a rectangle.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows area is measured in square units. B. The student knows a square unit is represented by unit^2 (cm^2, dm^2). C. The student knows the area of a rectangle is determined by multiplying the length times width ($A = lw$). D. The student is able to compute the area of a rectangle given the length and width.

Related Area(s)

State Goal	1
District Goal	
Program Goal	2,4,6

Suggested Activities: Grade(s) 6

Title: Area = Square Units as Unit^2

Group Size: entire class

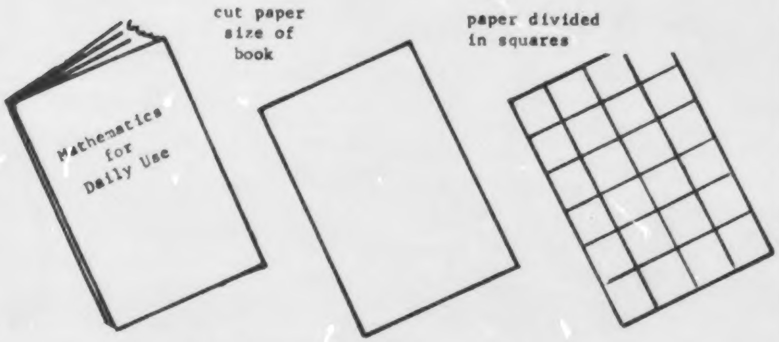
Materials: a specific student text, a piece of paper cut to fit the surface of the student text

Procedure(s):

- Have the student divide the cut paper into squares.
- Ask the student to count the squares in order to find the area. (Area is measured in square units.)
- Point out that there are the same number of squares or units in each row; therefore, a more efficient way to count units is to multiply the two dimensions.

Area = L x W square units, or

Area = L x W unit^2



Suggested Monitoring Procedures

Observe students, noting those who master the concept easily and those having difficulty.

Possible Resources

District adopted text.

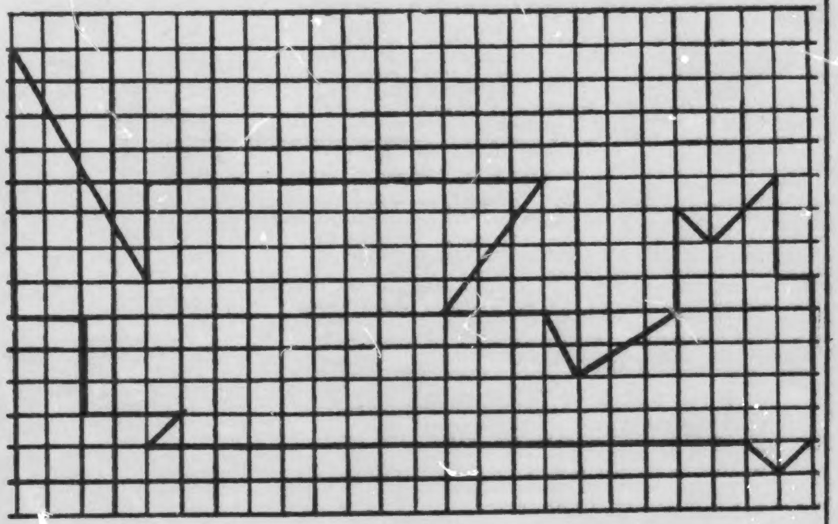
District Resources

Suggested Activities: Grade(s) ______

Title: Area of "Whatsit?"
Group Size: entire class
Materials: graph paper, straightedge

Procedure(s):

- Each student draws a closed figure (Whatsit) on his/her graph paper using a straightedge. The figure must be:
  - drawn on the lines of the graph paper, or
  - drawn from the corner of one square on the grid to the corner of another square (making a diagonal line). See illustration.
  - all straight lines, no curves!
- Students may then trade drawings and compute the area of the figure. (Student must compute area for both rectangles and triangles.)



Suggested Monitoring Procedures

Give students a worksheet with rectangles showing the length and width and have them compute the area.

Possible Resources

District adopted text.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows area is measured in square units. B. The student knows a square unit is represented by unit^2 (cm^2, dm^2). C. The student knows the area of a triangle is determined by multiplying one-half the base times the height ($A = \frac{1}{2}bh$).

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Discover the Area of a Triangle
Group Size: entire class
Materials: rulers, compass, scissors, pencils, graph paper

Procedure(s):

- Have students draw three or four rectangles of various sizes on the graph paper.
- Have students draw a diagonal in each rectangle.
- Have students cut out rectangles and review the formula for finding the area. ($A = bh$)
- Cut one rectangle along diagonal and ask students if the two triangles that result are congruent. (Yes, they are.)
- Have them try the same procedure with the other rectangles you have drawn.
- Emphasize with the students that the result is one-half the area of the rectangle equals the area of the triangle.
- Write formula for finding the area of a triangle. ($A = \frac{1}{2}bh$)

Suggested Monitoring Procedures

Observe the class during the activity; adjust and reteach if necessary.

Give the students a worksheet on computing the area of a triangle with triangles of varying heights and bases.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

Title: Triangles and Parallelograms Compared

Group Size: individual, small group, entire class

Materials: rectangle cut from construction paper, parallelograms cut from construction paper, scissors, ruler, pencil

Procedure(s):

- Have the students measure length and width of rectangle and calculate the area of the rectangle ($A = l \times w$).
- Have students draw a diagonal; then have them cut on the diagonal.
- Have students observe the shapes of the resulting figures and compare the two triangles. Ask them if the triangles are the same size.
- Ask students to compare the area of one triangle to the area of the rectangle.
- Have students repeat the process with parallelograms. ($A = bh$)
- Ask students if a formula can be derived for the area of the triangle. ($A = \frac{1}{2}bh$)

Suggested Monitoring Procedures

Observation of students during the activity.

Give students a worksheet with figures of triangles and parallelograms. Have them indicate the formula to use when finding the area of each one. Have them compute the area using the formula they chose.

Possible Resources

District adopted text.

District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Graphs

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. a picture graph (pictograph) is a visual representation of a set of data where each picture represents an object.		K-1					
a. graphs which deal with whole numbers.		K-3					
b. graphs where picture represents other than whole numbers.	299	4-6					
. a bar graph is a visual representation of a set of data where one unit may represent 1, 2, 5 or 10 items.	301	2-3					
. a line graph represents data by specific points on a grid, the points being joined by lines to form a visual representation (or pattern).	303	2-4					
. an ordered pair of numbers identifies a point on a grid.	305	5-6					
. a double bar graph compares two sets of data.	305	5-6					
. a circle graph shows information in terms of percentage of a fraction of the whole.		6-7					
. a table is a collection of data displayed in a specific order according to its variables.	311	5-8					
. a vertical axis is the vertical line along which a coordinate is measured.	313	5-6					
. a horizontal axis is the horizontal line along which a coordinate is measured.	311	5-6					
. coordinates are sets of numbers used to locate a point in space. (4, 3), (2, 1).	303	5-6					
The student is able to:							
. read and construct a picture graph (pictograph) from given and/or collected data (whole numbers).	299	K-3					
. read and construct a picture graph (pictograph) from given and/or collected data (whole numbers and fractional parts).		4-6					
. collect data.		2-4					
. order or rank collected data in the form of a table.	311	5-8					
. plot data from tables.	311	5-8					
*. read and interpret data on a simple bar graph.	303	2-4					
. read and interpret data on a multiple bar graph.		5-7					
*. construct a bar graph from given data or from collected data.	301	3-4					
. construct a multiple bar graph from given data or from collected data.	307	5-6					
*. construct a single line graph from given data or from collected data.	303	4-5					
. construct a multiple line graph from given data or from collected data.	315	6-8					
. read and interpret data on a circle graph.	317	6-7					
. construct a circle graph from given data or collected data.		6-7					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ________________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows graphs where pictures represents other than whole numbers. B. The student is able to read and construct a picture graph (pictograph) from given and/or collected data (whole numbers and fractional parts).

State Goal 1

District Goal

Program Goal 2,4,6

Related Area(s)

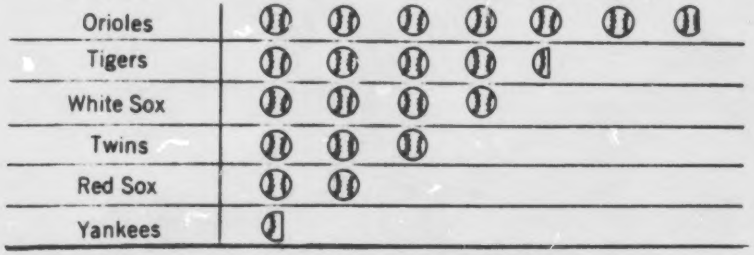
Suggested Activities: Grade(s) 4-6

Title: Graph Blanks
Group Size: entire class
Materials: worksheet with part of the pictograph completed and parts left blank (see illustration)

Procedure(s):

- On the chalkboard or overhead show a picture graph. Discuss with students that a picture graph represents data by using pictures as symbols to stand for numbers.
- Show other examples of picture graphs and have students interpret the data orally from the examples.
- Give students a worksheet with a picture graph and several questions they must interpret from the graph.
- In addition show a picture graph with items missing. Students are to complete the graph using known data.

Example: A. Home Runs— American League



1. Without counting, which team hit the most home runs? (Orioles)
2. The Twins hit 18 home runs. Each picture of a baseball stands for how many home runs? (six)

Suggested Monitoring Procedures

Teacher notes responses and makes necessary corrections.

Possible Resources

District adopted text.
Newspapers.
Magazines.

District Resources

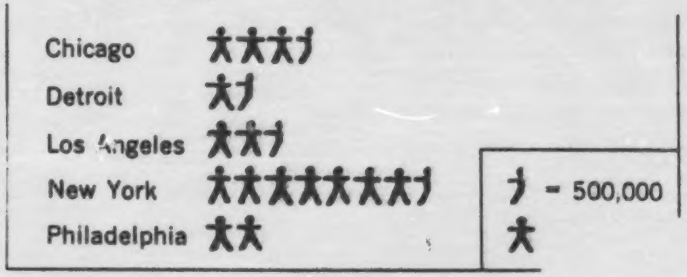
Suggested Activities: Grade(s) 4-6

Suggested Monitoring Procedures

Possible Resources

Example: B. Complete the following graph.

1. From the information indicate what the full figure (👤) should represent. (1 million)
2. From the data what do you think the graph is representing? (population)
3. From the data title the graph. (population of some large cities)



Title: Pet Parade

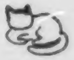
Group Size: entire class

Materials: graph paper, crayons, animal patterns (see illustration)

Procedure(s):

- Have students list the pets (real or imaginary) at their home (cats, birds, dogs).
- The students individually make graphs. They must decide what the relationship between the symbol and the actual number of animals is.

Example:

 = 5 cats

- Students may color their graph and give it a title.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 2-4

Student Learning Objective(s) A. The student knows a bar graph is a visual representation of a set of data where one unit may represent 1, 2, 5 or 10 items. B. The student is able to construct a bar graph from given data or from collected data.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

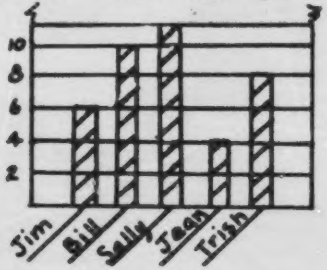
Suggested Activities: Grade(s) 4

Title: Tic-Tac Graph
Group Size: pairs
Materials: paper, pencil, graph paper

Procedure(s):

- Students play twenty games of tic-tac-toe, keeping track of winners or cat games.
- They then construct a bar graph to show results.
  NOTE: Hangman or other short games could be used also.

Example:



Title: Bar None
Group Size: entire class
Materials: graph paper grid worksheet, strips of colored construction paper (each with its own value: red = 1 unit, blue = 2, green = 5, black = 10, orange = 20)

Procedure(s):

- Give each student a grid worksheet and a collection of the unit strips.
- Pick some familiar topic such as yards a football player may carry the ball.
- Put data on board.

Suggested Monitoring Procedures

Teacher leads responses and helps if necessary.

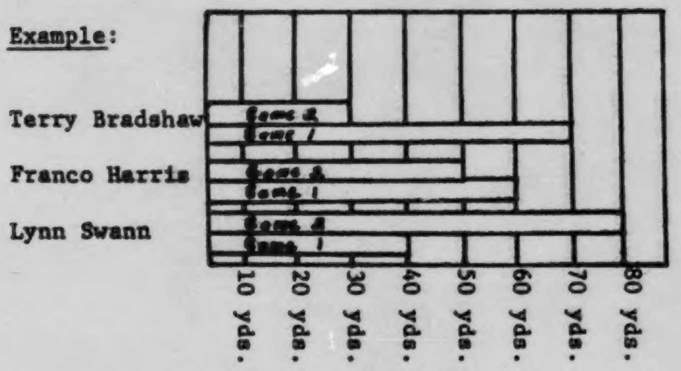
Possible Resources

District Resources

Suggested Activities: Grade(s) 4	Suggested Monitoring Procedures	Possible Resources

- Help students put amounts (units) on horizontal axis and subjects on vertical axis.
- Students pick colored strips that would equal same number as data on board.
- Arrange largest colored strip on bottom, then in order, etc.

Example:



District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 2-5

Student Learning Objective(s) A. The student knows a line graph represents data by specific points on a grid, the points being joined by lines to form a visual representation (or pattern). B. The student is able to read and interpret data on a simple bar graph. C. The student is able to construct a single line graph from given data or from collected data.

State Goal	1
District Goal	
Program Goal	2,4,6

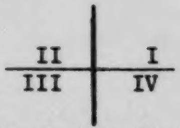
Suggested Activities: Grade(s) 4-5

Title:	Graphs Graphics
Group Size:	entire class
Materials:	graph paper worksheet; sets of coordinate points that, when connected by a line create a picture or design.

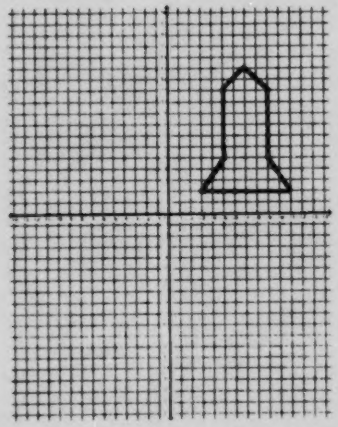
Procedure(s):

- Hand out graph paper and list of points. Restrict points to quadrant I until students get used to working with graphs.

  Example:



- Design could be colored when finished as an additional activity.



Suggested Monitoring Procedures

Teacher observes progress and helps when necessary.

Possible Resources

Fun and Games with Mathematics
Haugaard, Harlock
Prentice-Hall Learning Systems, Inc.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-7

Student Learning Objective(s) A. The student knows an ordered pair of numbers identifies a point on a grid. B. The student knows a double bar graph compares two sets of data. C. The student knows coordinates are sets of numbers used to locate a point in space. (4, 3), (2, 1).

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

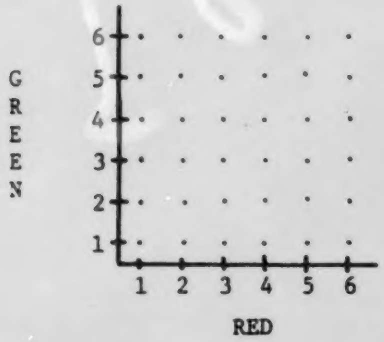
Suggested Activities: Grade(s) 5-6

Title: Die Plot Game
Group Size: pairs
Materials: two red dice (1-6), two green dice (1-6), game sheet

Procedure(s):

- Students roll dice to determine which player starts the game.
- First player rolls the four dice.
- He/she chooses one red die and one green die. marking the point each represents, choosing either X or O for his/her marker.
- Once a point is covered, it belongs to that player.
- Four in a row, vertical, horizontal, or diagonal, wins.

Example:



Suggested Monitoring Procedures

Possible Resources

Aftermath, Dale Seymore
Creative Publications
Book 1, p. 73

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-7

Student Learning Objective(s) A. The student knows an ordered pair of numbers identifies a point on a grid. B. The student knows a double bar graph compares two sets of data. C. The student knows coordinates are sets of numbers used to locate a point in space. (4, 3), (2, 1). D. The student is able to read and interpret data on a multiple bar graph. D. The student is able to construct a multiple bar graph from given data or from collected data.

State Goal	1
District Goal	
Program Goal	2,4,6

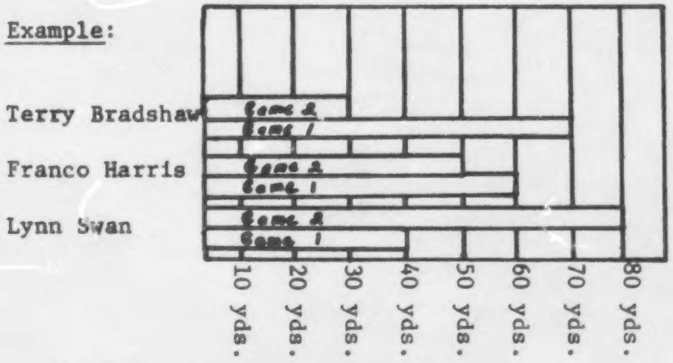
Suggested Activities: Grade(s) 5-6

Title: Bar None
Group Size: entire class
Materials: graph paper grid already dotted, strips of colored construction paper (each with its own value: red=1 unit, blue=2units, green=5, black=10, orange=20)

Procedure(s):

- Give each student a grid worksheet and a collection of the unit strips.
- Pick some familiar topic such as number of yards different football players carry the ball per game.
- Put data on board.
- Help students put amounts (units) on a horizontal axis and subjects on a vertical axis.
- Then have students pick colored strips that would equal same number as data on board.

Example:



Suggested Monitoring Procedures

Teacher leads responses and helps if necessary.

Possible Resources

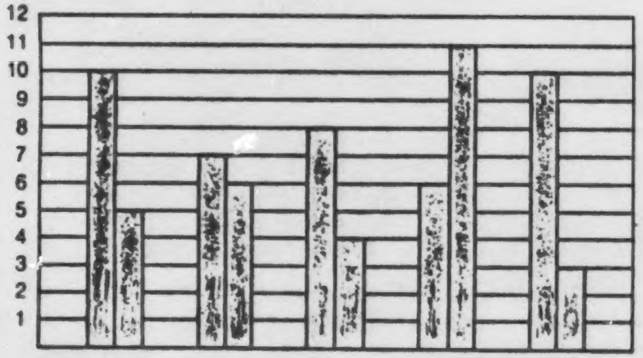
District Resources

Suggested Activities: Grade(s) 5-6

Title: Graph Greats
Group Size: entire class
Materials: graph worksheet without units and names but with bars and units marked

Procedure(s):

- Give pairs of students prepared graph worksheet. Have the bars and units marked but unnamed.
- Let students name and mark the bars and units so anyone can interpret the graph.
- When finished, students trade graph papers with other pairs of students.
- Then ask students questions that would apply to all graphs such as:
  - What is the name of the graph?
  - What are units?
  - How does bar number 2 compare to bar number 5?
- Responses can be oral or students may write them on paper and then discuss.



Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Objective Placement 5-7

State Goal	1
District Goal	
Program Goal	2,4,6

Student Learning Objective(s) A. The student knows an ordered pair of numbers identifies a point on a grid. B. The student knows a double bar graph compares two sets of data. C. The student knows coordinates are sets of numbers used to locate a point in space. (4, 3), (2, 1). D. The student is able to read and interpret data on a multiple bar graph. E. The student is able to construct a multiple bar graph from given data or from collected data.

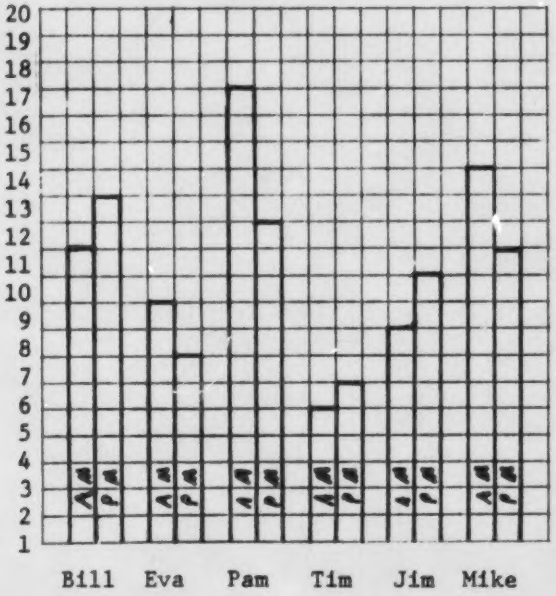
Suggested Activities: Grade(s) 5-6

Title: Double Tic-Tac-Graph
Group Size: pairs
Materials: paper, pencil, graph paper

Procedure(s):

- Students play twenty games of tic-tac-toe in the morning, twenty in the afternoon, keeping track of the winners or cat games.
- Then they construct a double bar graph to show the results.

Example:



Suggested Monitoring Procedures

Possible Resources

District adopted text

District Resources

Suggested Activities: Grade(s) 5-6

Variation: Have students from two classes polled as to their favorite sports, foods, colors and make appropriate graphs.

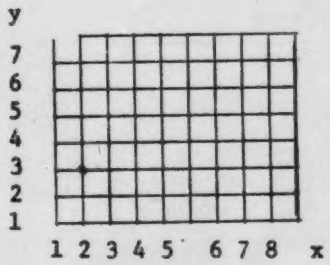
NOTE: Hangman or other short games could be used also.

Title:	Five in a Row
Group Size:	entire class
Materials:	overhead projector, transparency of an x-y coordinate grid, or worksheet with grid

Procedure(s):

- Explain terms before playing game.
- Divide students into two teams. To one team at a time, call two numbers from zero to ten, i.e., 2,3.
- Team members plot the two numbers on the grid, i.e., go two over on the x or horizontal axis and up three on the y or vertical axis, and mark the point where the two intersect.

Example:



- Students then multiply the two numbers, i.e., 2x3=6. If answer is correct, team gets to keep their mark on the grid. If answer is incorrect, mark is removed.
- The first team to set five marks in a row on the grid (horizontally, vertically or diagonally) wins the game.

Suggested Monitoring Procedures

Teacher observes responses and makes necessary corrections.

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-8

Student Learning Objective(s) A. The student knows a table is a collection of data displayed in a specific order according to its variables. B. The student is able to order or rank collected data in the form of a table. C. The student is able to plot data from tables.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

Suggested Activities: Grade(s) 5-8

Title: Data Grouping

Group Size: entire class

Materials: worksheet of related facts and unrelated facts (For example, on the worksheet, put 10 items related to car economy, 10 items related to speed of a horse, 10 items related to average yards a football is carried. Mix all these facts up on the worksheet (don't put them in order or don't group them), pre-made graph axis.

Procedure(s):

- Students first group all facts together that have like information.
- Then within each group, the students order the facts with smallest to largest or largest to the smallest.
- Students then use the pre-made graph axis to plot the information in each of the groups. They have to name each graph and axis (including units on appropriate axis).
- Information can be as difficult as group ability allows.

Suggested Monitoring Procedures

Teacher helps individuals as problems arise.

Possible Resources

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-6

Student Learning Objective(s) A. The student knows a vertical axis is the vertical line along which a coordinate is measured. B. The student knows a horizontal axis is the horizontal line along which a coordinate is measured.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

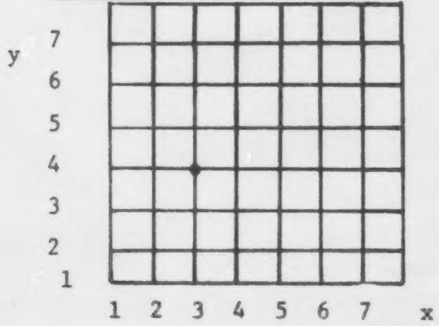
Suggested Activities: Grade(s) 5-6

Title: Five In A Row
Group Size: entire class
Materials: overhead projector, transparency of an x-y coordinate grid, or worksheet with grid

Procedure(s):

- Explain terms before playing game.
- Divide students into two teams. To one team at a time, call two numbers from zero to ten, i.e., 2, 3.
- Team members plot the two numbers on the grid, i.e., go two over on the x or horizontal axis and up three on the y or vertical axis, and mark the point where the two intersect.

Example:



- Students then multiply the two numbers, i.e., 2x3=6. If answer is correct, team gets to keep their mark on the grid. If answer is incorrect, mark is removed.

Suggested Monitoring Procedures

Teacher observes responses and makes necessary corrections.

Possible Resources

District Resources

Suggested Activities: Grade(s) 5-6	Suggested Monitoring Procedures	Possible Resources
. The first team to get five marks in a row on the grid (horizontally, vertically or diagonally) wins the game.		
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) The student is able to construct a multiple line graph from given data or from collected data.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Using Data Graphically
Group Size: entire class
Materials: graph paper

Procedure(s):

- Give students data or have them collect data showing enrollments in several classes by grade level. Have them construct a multiple line graph from the data.

Example: Room enrollments grades 4, 5, 6.

4th Grade	5th Grade	6th Grade
Rm.# 1-24	Rm.# 7-31	Rm.#13-29
2-23	8-30	14-32
3-28	9-29	15-34
4-26	10-32	16-33
5-30	11-31	17-30
6-29	12-33	18-31

- use a different color for each grade

Suggested Monitoring Procedures

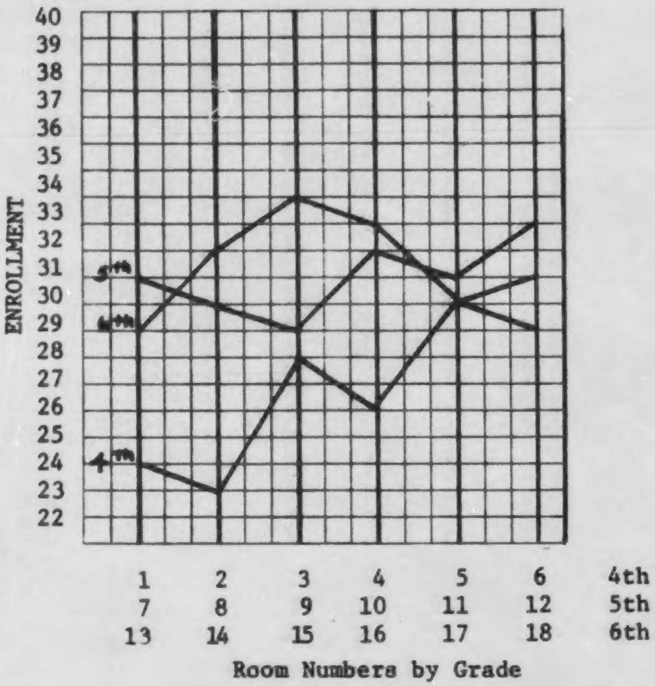
Check worksheets to see if data is correctly graphed

Possible Resources

District adopted text
Newspapers
Magazines

District Resources

Suggested Activities: Grade(s) 6



Variation: Have students collect data on the number of boys and girls in each room and graph the data.

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-7

Student Learning Objective(s) A. The student is able to read and interpret data on a circle graph.

B. The student is able to construct a circle graph from given data or collected data.

State Goal	1
District Goal	
Program Goal	2,4,6

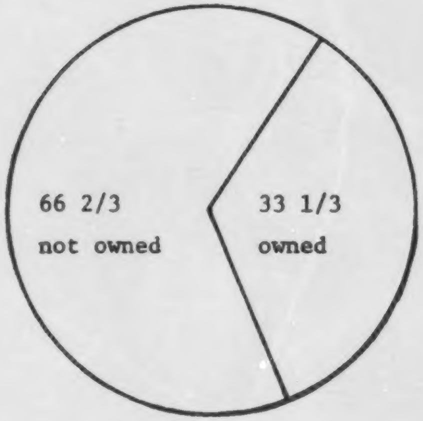
Related Area(s)

Suggested Activities: Grade(s) 6

Title: Monopoly Graphing
Group Size: small groups
Materials: Monopoly game, paper, pencil, colors

Procedure(s):

- Have the students play a regular game of Monopoly for half an hour.
- Stop at the end of the half-hour and collect data: the amount of property owned by each individual, the amount not owned.
- Figure the percentages of owned and unowned property in relationship to all the property on the board.
- Construct a circle graph to illustrate data.



Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Probability and Statistics

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. that probability is expressed in ratios,which is a comparison.	321	6-8					
. the probability of an event can be expressed as a fraction (common) or a per cent.	321	6-8					
. that probability is the number of desired outcomes compared to the number of possible outcomes. Example: The probability of heads up if a coin is flipped. Number desired: 1 (heads). Number possible: 2 (heads or tails). Probability is 1/2 or 50%.	321	6-8					
. the average (mean) of a set of scores is found by dividing the sum of the scores by the number of scores.	323	4-8					
. the median of a set of scores is the middle scores when the scores are in numerical order.	325	6-8					
The student is able to:							
*. find the average of a set of scores.	323	4-6					
*. find the mean of a set of scores.	323	7-8					
*. find the median of a set of scores.	325	6-8					
. find the probability of an event.	321	6-8					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ________________

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows that probability is expressed in ratios, which is a comparison. B. The student knows the probability of an event can be expressed as a fraction (common) or a per cent. C. The student knows that probability is the number of desired outcomes compared to the number of possible outcomes. Example: The probability of heads up if a coin is flipped. Number desired: 1 (heads). Number possible: 2 (heads or tails). Probability is 1/2 or 50%. D. The student is able to find the probability of an event.

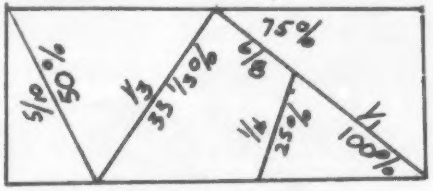
State Goal	1
District Goal	
Program Goal	1,4

Suggested Activities: Grade(s) 6

Title: Probability Puzzle
Group Size: small groups of two or more
Materials: paper, ruler, scissors

Procedure(s):

- Have each student make a design like the one below. Each segment in the design should have a probability expressed as a fraction or ratio on one side and its per cent on the other side.



- Cut apart the design to make a puzzle.
- Have students trade puzzles and try to put them back together by matching probability fraction or ratio and its percent.

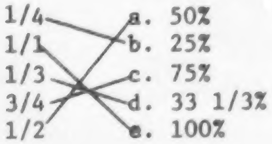
Title: Probability Flip
Group Size: small groups of four to six
Materials: one coin for each student, one die per group

Procedure(s):

- Have the students flip the coin 100 times and keep data on the number of heads and tails.
- Have the students roll the die 100 times and keep data on the number of 1's, 2's, 3's, 4's, 5's and 6's rolled.

Suggested Monitoring Procedures

Give students a matching exercise using a ratio or fraction matched to a per cent, i.e.



Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) 6	Suggested Monitoring Procedures	Possible Resources

- Explain to students how to find probability. Probability is a number that expresses our degree of belief that an outcome will occur. The formula for probability is:

$$\text{probability} = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

- Ask them to compare the computed probability of flipping a coin and rolling a die. How close did they come?
- Give students problems on finding probability of an event, i.e.

Betty is going to choose a date from the month of January at random. Give the probability that she will choose January 13, 1/31; January 21, 1/31; January 9 and 10, 2/31; January 11, 12, 14, 3/31; a date consisting of two digits 22/31; a date with one in it 13/31; a date with three in it 5/31; a date with an even number 15/31.

District Resources

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student knows the average (mean) of a set of scores is found by dividing the sum of the scores by the number of scores. B. The student is able to find the average of a set of scores. C. The student is able to find the mean of a set of scores.

State Goal	1
District Goal	
Program Goal	1,4

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Mean Code
Group Size: individual, small group
Materials: code worksheets

Procedure(s):

- Explain that mean and average are the same and how to find mean of a set of scores.
- Have students do "mean" code worksheet.

"MEAN" CODE WORKSHEET

Fill in the message by using the code.
Find the mean score for each problem.

(1)	(2)	(3)	(4)
10	59	18	102
26	83	16	14
40	47	22	34
24	23	24	13

(5)	(6)	(7)	(8)
44	10	56	20
32	12	27	16
24	12	92	11
36	14	117	13
	17		

(9)	(10)	(11)
16	29	48
9	33	24
14	25	24
10	21	36
10	27	28
13		

Code

12 - G
13 - A
15 - O
14 - E
11 - M
10 - Z
20 - S
25 - N
32 - T
49 - P
53 - L
27 - U
34 - I
61 - H
73 - V

Suggested Monitoring Procedures

Correct worksheets noting student problems in finding a mean set of scores. Assist students who are having difficulty.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) 7	Suggested Monitoring Procedures	Possible Resources

(12) 14	(13) 20	(14) 15	(15) 11
16	14	11	12
10	14	21	11
10	8	25	14
10			7
6			
4			

(Message)

HAPPINESS IS:

3	8	2	7	5	1	9	
	15	6	11	4			
14	10	12	12	2	13	13	

Key
Solving
Math
Puzzles

District Resources

SMALL SCHOOLS PROJECT

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows the median of a set of scores is the middle score when the scores are in numerical order. B. The student is able to find the median of a set of scores.

State Goal	1
District Goal	
Program Goal	1,4

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Median, Median
Group Size: entire class
Materials: overhead transparency, overhead

Procedure(s):

. Indicate to students that sometimes statisticians describe data by using the term median which means the middle score.

. Note that the median has as many numbers above it as it has below it.

. Use a list of scores such as math scores of a class to show how the median score is obtained., i.e., math scores 74, 62, 96, 74, 51, 43, 89, 89, 76, 89, 95, 76, 100.

Example:

1. Arrange in order--lowest to the highest:

100
96
95
89
89
89
76 - median
76
74
74
62
51
43

. Divide students into groups of four to eight. Have each group line up in front of a desk. Place a packet of identical problems on each desk (at least two per person).

Suggested Monitoring Procedures

Observe teams, noting students having difficulty with the concept. Group for reteaching.

Possible Resources

District adopted text

District Resources

Suggested Activities: Grade(s) _______

- Have the groups put the problems on the board with answers (in relay style).
- The first team through (all correct) is the winner.

Title: Median
Group Size: large groups (8 or more)
Materials: chalkboard, chalk

Procedure(s):

- Divide students into groups of four to eight players each.
- Have each group line up in front of a desk. Place a packet of identical problems on each desk (at least two per person).
- Explain to class what median is, and how to find it.
- Have the groups put the problems on the chalkboard with answers (in relay style).
- The first team through (all correct) is the winner.

Suggested Monitoring Procedures

Possible Resources

District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Measurement: Time

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8
The student knows:							
. the names of the days of the week		K-1					
. the names of the months.		1-2					
. the names of the months in sequence.		1-2					
. the short hand of the clock is the hour hand.		2					
. the long hand of the clock is the minute hand.		2					
. the term "minute" refers to a unit of time measurement.		2					
. the term "hour" refers to a unit of time equal to 60 minutes.		2					
. the basic units of time covered in K-3; hour (60 minutes), half-hour (30 minutes), quarter hour (15 minutes), five minute intervals.	329	4					
The student is able to:							
*. tell time to the hour.		1-2					
*. tell time to the half hour.		1-2					
*. tell time to the quarter hour.		2-3					
*. tell time by 5 minute intervals.	329	3-4					
*. write time in notation, i.e., 12:00, 12:30, 12:15, 12:55.		1-4					
. tell time in minutes from both clock face and digital.	329	4					
. use p.m. and a.m. notation in writing times.	329	4					
*. convert a unit of time to another unit (hours, minutes, seconds, days, weeks, months, years).	331	4-8					
. compute time intervals between two times.	333	4-8					
. read time charts.	333	4-8					
. solve work problems.	335	4-8					
The student values:							
. estimation is a useful skill in time measurement.		K-3					

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ____________

SMALL SCHOOLS PROJECT

Suggested Objective Placement 4

Student Learning Objective(s) A. The student knows the basic units of time covered in K-3; hour (60 minutes), half-hour (30 minutes), quarter hour (15 minutes), five minute interval. B. The student is able to tell time in five minute intervals. C. The student is able to tell time in minutes from both

Related Area(s) clock face and digital. D. The student is able to use p.m. and a.m. notation in writing times.

State Goal	1
District Goal	
Program Goal	1,2,3,5

Suggested Activities: Grade(s) 4

Title:	Time Match
Group Size:	any size
Materials:	a clock stamp or materials to draw clock faces, 4" squares of tagboard, masking tape for edges of cards, marking pen (washable) clear contact paper, 2" by 6" strips of tagboard (for time cards), container for time cards, clock (envelopes?)

Procedure(s):

. Make clock faces and cover with clear contact paper so clock hands can be redrawn.

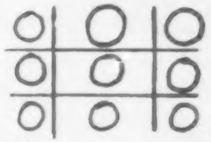
. Teacher may draw in hands of clock on faces or leave blank.

. Student is given time cards with a time indicated.

. Student may match time to clock or draw face of clock and correctly placed hands on unmarked clock face.

Variation: Clock faces can be arranged in block order and a team can identify time to play tic tac toe. Teacher or student gives time and clock hands are drawn in correctly. Student loses position if time is indicated incorrectly.

Example:



Suggested Monitoring Procedures

Give post test using clock faces with time written on them. Answer sheet used to write times of the clock faces.

Possible Resources

Fun and Games with Mathematics, Hougaard and Horluck, Prentice-Hall, pages 77 and 78.

Math Activity Worksheet Masters, Stokes and Laycock, Creative Publications, pages 82 and 83.

District Resources

Suggested Activities: Grade(s) 4

Suggested Monitoring Procedures

Possible Resources

- Clock faces can be arranged in block order and covered with a flap of paper which is numbered. Students are in two teams. One member of a team is handed a time card. He guesses what time is behind a number. The flap is raised to check. If correct, the flap is removed. If not, the time is again covered and must be remembered for another attempt to guess correctly.

Title: Clock-0
Group Size: entire class
Materials: paper divided into 24 squares with clock face in each (Clock-0 cards), 24 cards with a time written on each, beans, square of paper or other marker, one manipulative clock

Procedure(s):

- To make Clock-0 cards, hold up a time card and have student set manipulative clock at the correct time.
- Students choose any clock face on their Clock-0 card and make it say the same time. Do this until all 24 squares with clock faces are marked.
- Mix up time cards and show them one at a time.
- Students place a bean on that time on their Clock-0 card.
- Student "Clock-0's" when he/she gets five in a row.

District Resources

SMALL SCHOOLS PROJECT

Suggested Objective Placement 4-8

Student Learning Objective(s) The student is able to conv rt a unit of time to another unit (hours, minutes, seconds, days, weeks, months, years).

State Goal	1
District Goal	
Program Goal	1,2,3, 5

Related Area(s)

Suggested Activities: Grade(s) 4-6

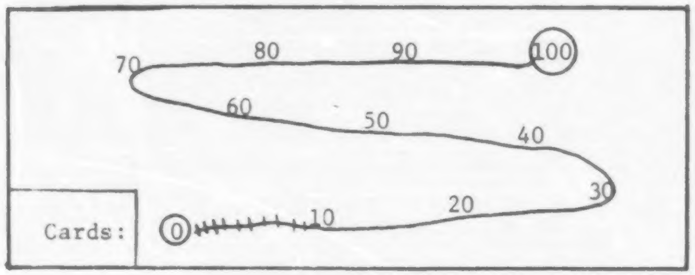
Title:	Score 100
Group Size:	small group
Materials:	game board, game cards, marks (one per player)

Procedure(s):

- Students draw cards in turn and convert the measures from one unit of time to another.
- They move the number of spaces for their answer.
- If incorrect they must move backwards the number of the correct answer.

Example:

Game Board



Example card: Grades 1-6

You have 120 minutes; you may move the number of hours this is equal to.

Example card: Gr. 7-8

You have 362 seconds; you may move the number of seconds left after you convert to minutes.

Suggested Monitoring Procedures

Teacher notes success and interest in game and helps students to learn game.

Possible Resources

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

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SMALL SCHOOLS PROJECT

Suggested Objective Placement 4-8

Student Learning Objective(s) A. The student is able to compute time intervals between two times.

B. The student is able to read time charts.

State Goal: 1

District Goal:

Program Goal: 1,2,3,4

Related Area(s)

Suggested Activities: Grade(s) 6	Suggested Monitoring Procedures	Possible Resources

Title: Time to Travel
Group Size: small groups
Materials: per group: Greyhound time table, paper to keep track of travel, map of Pacific Northwest

Procedure(s):

- Each group is given three days (72 hours) to travel around the Pacific Northwest.
- They are to keep track of the time they are traveling and the time between travel. At the end of the third day, they must return to their starting point.
- The group which has spent the most time on the bus and the least amount of time waiting is the winner.

Title: Time Rally
Group Size: two to four
Materials: game board, four markers in shape of cars, 50 game cards with time intervals on them (example--12:40 - 12:50
1:10 - 2:20)

Procedure(s):

- Students shuffle the cards.
- Draw cards and figure out the interval between times.
- If correct, move the amount of the interval on the race track. If not, move back correct amount of time.
- See next page for Game Board.

District Resources

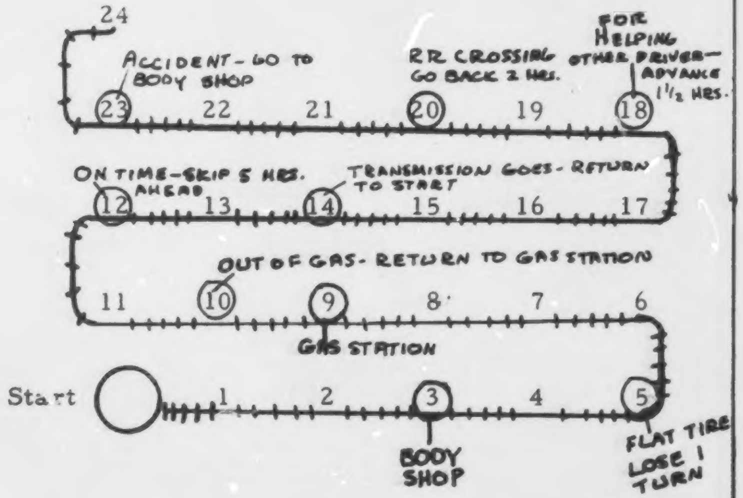
Suggested Activities: Grade(s) 6

Suggested Monitoring Procedures

Possible Resources

12:40
to
12:50

Game Card


24
ACCIDENT - GO TO BODY SHOP
RR CROSSING GO BACK 2 HRS.
FOR HELPING OTHER DRIVER - ADVANCE 1½ HRS.
23
22
21
20
19
18
ON TIME - SKIP 5 HRS. AHEAD
TRANSMISSION GOES - RETURN TO START
12
13
14
15
16
17
OUT OF GAS - RETURN TO GAS STATION
11
10
9
8
7
6
GAS STATION
Start
1
2
3
4
5
BODY SHOP
FLAT TIRE LOSE 1 TURN

District Resources

SMALL SCHOOLS PROJECT

Suggested Objective Placement 4-8

Student Learning Objective(s) The student is able to solve work problems.

State Goal	1
District Goal	
Program Goal	6

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Move On

Group Size: small groups (two to six each)

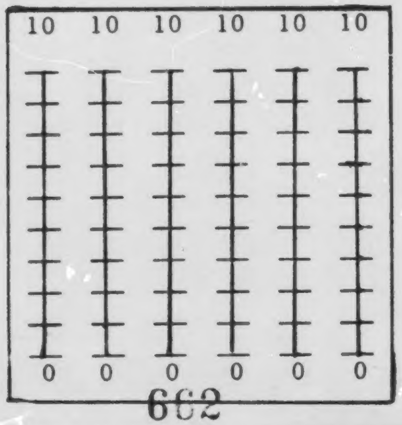
Materials: game board, six problem folders (containing 30 numbered problems each), answer card for each folder, markers (one per student), spinner marked 1-30

Procedure(s):

- Each student in the group draws a problem folder and another student takes his/her answer card.
- In turn they spin the spinner and work the problem indicated (no repeats).
- Score +1 point for correct answer, -2 for incorrect answer. Move the appropriate number of spaces for each spin and answer.
- First person scoring ten wins.

Example:

Game Board



Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
		District Resources

664

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SUBJECT: Mathematics

SPECIFIC AREA: Measurement: Money

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
. the basic units of money covered in K-3; penny, nickel, dime and quarter, half-dollar, dollar.	339	4-6					
The student is able to:							
. write the value of money equal to or less than $1,000.00.	339	4-6					
*. count change totaling less than $20.00, beginning with a certain value.	341	4-6					
. determine if the amount of change received from a purchase is correct.	345	4-6					
. make purchase and change from $100.00 or less.		4-6					
*. add and subtract two money values using dollar and cents notation.	347	4-6					
. solve money problems using money by use of multiplication or division.	351	4-6					
. multiply or divide a given amount of money.	351	4-6					
. estimate money to the nearest dollar.	345	4-6					
The student values:							

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OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ____________

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the basic units of money covered in K-3; penny, nickel, dime and quarter, half-dollar, dollar. B. The student is able to write the value of money equal to or less than $1,000.00.

State Goal	1,8
District Goal	
Program Goal	2,3,4

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Money Bingo

Group Size: entire class

Materials: teacher flash cards with pictures of all change pieces, and all dollar bill values less than $1,000.00, student bingo cards with amounts of money written in each square (can use bigger cards for older students)

Example:

63¢	$1.53	$263
$119.01	$5.00	$998
$14	$12	$68.95
$19.25	$37	$501.05

Procedure(s):

- Teacher holds up flash cards of different money pieces.
- Students cover square if they have the equivalent money value written on bingo card.
- Student wins when a row is covered vertically or horizontally.

Suggested Monitoring Procedures

Possible Resources

District Resources

669

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Suggested Activities: Grade(s) 4-6

Title: Money Math

Group Size: small group, entire class

Materials: worksheet

Procedure(s):

- Prepare a worksheet with two columns. In column one have pictures of coins and bills of varying amounts. In column two, list the written denominations.
- Have the students match the money values in column one with the equivalents in column two.

Example:

Column One	Column Two
5¢ 5¢ 5¢ 1¢	28¢
25¢ 1¢ 1¢ 1¢	16¢

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the basic units of money covered in K-3; penny, nickel, dime and quarter, half-dollar, dollar. B. The student is able to count change totaling less than $20.00, beginning with a certain value.

State Goal	1,8
District Goal	
Program Goal	1,2,3, 5,6

Related Area(s)

Suggested Activities: Grade(s) 4-6	Suggested Monitoring Procedures	Possible Resources

Title: Get The Right Change

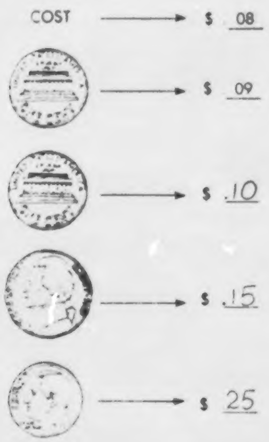
Group Size: small group, entire class

Materials: worksheet

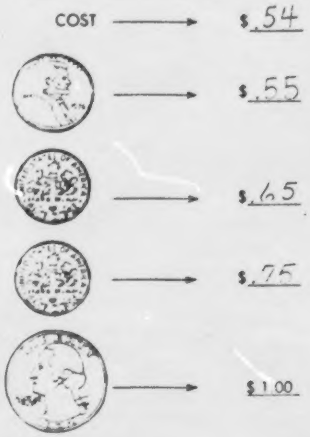
Procedure(s):

- Prepare a worksheet for making correct change from the examples shown on the back of this page.
- Have students fill in the blanks for giving the correct change beginning with a certain value.

COST	AMOUNT GIVEN TO CLERK
$ .08	$ .25



COST	AMOUNT GIVEN TO CLERK
$ .54	$1.00



Possible Resources:

Money, Basic Skills in Math, Hestwood and Orf, Allyn and Bacon

District Resources

673

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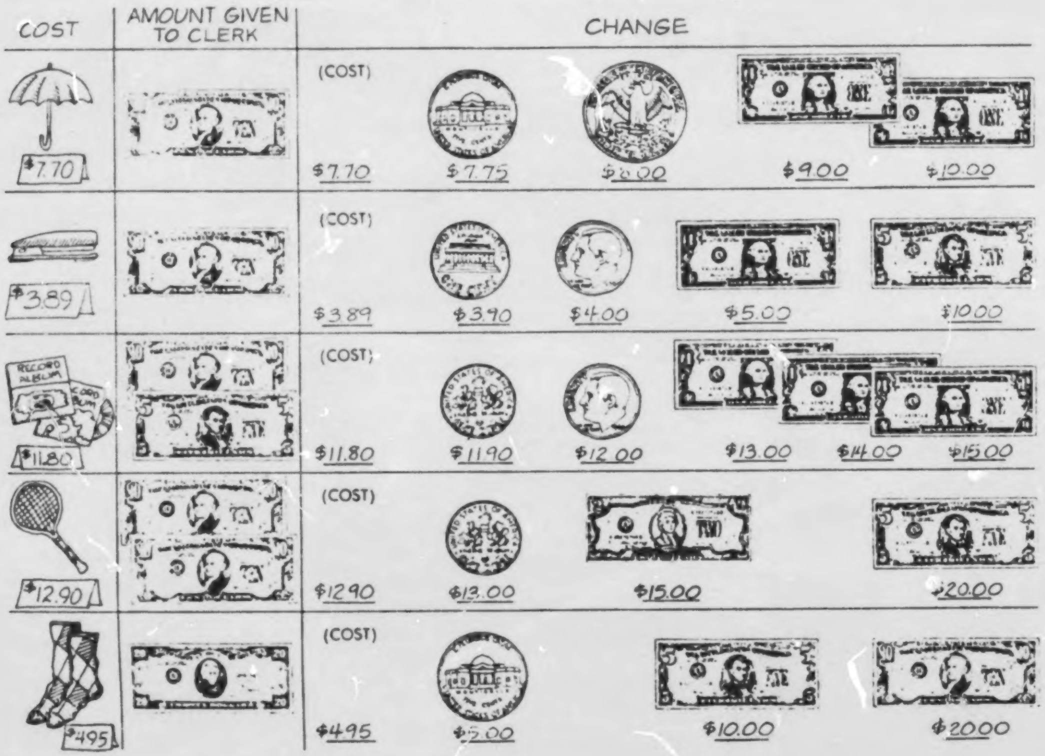
Suggested Activities: Grade(s) ______

Suggested Monitoring Procedures

Possible Resources


COST
AMOUNT GIVEN TO CLERK
CHANGE
$7.70
(COST)
$7.70
$7.75
$8.00
$9.00
$10.00
$3.89
(COST)
$3.89
$3.90
$4.00
$5.00
$10.00
RECORD ALBUM
$11.80
(COST)
$11.80
$11.90
$12.00
$13.00
$14.00
$15.00
$12.90
(COST)
$12.90
$13.00
$15.00
$20.00
$4.95
(COST)
$4.95
$5.00
$10.00
$20.00

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the basic units of money covered in K-3; penny, nickel, dime and quarter, half-dollar, dollar. B. The student is able to count change totaling less than $20.00, beginning with a certain value.

State Goal	1,8
District Goal	
Program Goal	2,3,4 5,6

Related Area(s)

Suggested Activities: Grade(s) 4-6	Suggested Monitoring Procedures	Possible Resources

Title: Student Stores

Group Size: small groups

Materials: large cardboard pictures of store interiors with goods (which are marked with prices — have students make the stores), activity cards for each store, play money

Procedure(s):

- Examples of types of stores: grocery, variety, hardware, drug store, sporting goods, hamburger stand.
- Assign student roles (purchasers and clerks).
- Purchasers get a twenty dollar bill, or the equivalent in bills and coins.
- Clerks get twenty dollars in small bills and coins.
- Activity cards list different purchases for different stores.
- Student purchasers select an activity card for a particular store, fill in the amounts of the items, and give the card to the clerks.
- The clerk adds up the purchases, the purchaser gives him/her some money, and the clerk gives back the correct change. Make sure the clerks count out the change in the correct manner.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4- 6

Student Learning Objective(s) A. The student knows the basic units of money covered in K-3; penny, nickel, dime and quarter, half-dollar, dollar. B. The student is able to determine if the amount of change received from a purchase is correct. C. The student is able to estimate money to the nearest dollar.

Related Area(s)

State Goal	1,8
District Goal	
Program Goal	2,3,4 5,6

Suggested Activities: Grade(s) 4-6

Title:	Guesstimating
Group Size:	small group
Materials:	spinner with numbers from 1-10 or more, cards with a grocery item and price on them

Procedure(s):

- Student picks a card with a product and price on it.
- The student then spins the spinner. The number on the spinner refers to a dollar amount.
- The student's job is to guess how many times the product price will go into the even dollar amount.
- Another student can check the answer, using either a calculator or paper and pencil.
- If student gives correct answer, he/she scores the amount shown on the spinner.
- Student reaching a score of 50 first wins the game.

Variation:

- Students figuring out correct change (from the price shown on the card and the dollar amount shown on the spinner, get an additional 2 points.

Title:	Total Please!
Group Size:	pairs, small groups
Materials:	gamecards (30 easy, 30 hard, see below), game board, markers

Procedure(s):

- Prepare game cards as shown under Example of Game Board.
- Students, in turn, draw card from "Easy" or "Hard" stack and estimate to the nearest dollar, how much money is shown. (Bills may also be used on cards.)

Suggested Monitoring Procedures

Teacher observes selections making appropriate comments when necessary.

Possible Resources

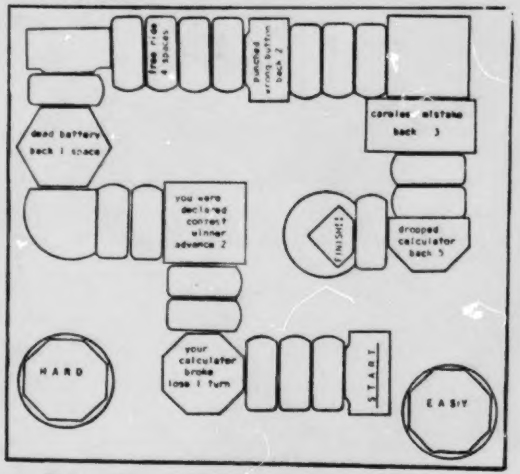
District Resources

Suggested Activities: Grade(s) ______

Suggested Monitoring Procedures

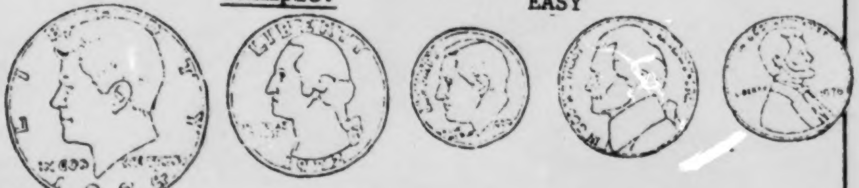
Possible Resources

Example of Board:


free ride 4 spaces
punched wrong button back 2
careless mistake back 3
dead battery back 1 space
you were declared contest winner advance 2
FINISH!
dropped calculator back 5
HARD
your calculator broke lose 1 turn
START
EASY

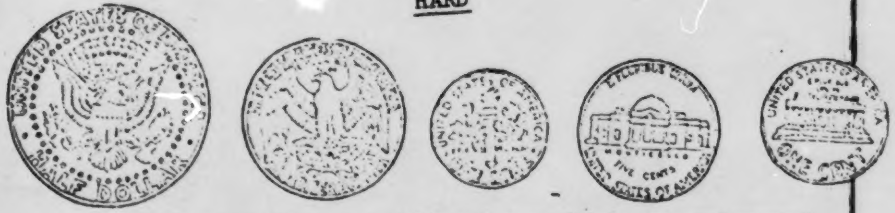
Example:

EASY



- When answering an easy card, student moves forward one space if correct, and back one space if incorrect.

HARD



- When answering a hard card, student moves forward two spaces if correct, and back two spaces if incorrect.
- Student reaching Finish first wins.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the basic units of money covered in K-3; penny, nickel, dime and quarter, half-dollar, dollar. B. The student is able to add and subtract two money values using dollar and cents notation.

State Goal	1,8
District Goal	
Program Goal	2,4,5,6

Related Area(s) __________

Suggested Activities: Grade(s) 4-6

Title: I Am The Greatest!
Group Size: pairs, small groups
Materials: index cards with varying amounts of money under $50.00 written on them

Procedure(s):

- Students shuffle cards well.
- Choose cards one at a time, anywhere from the face down deck.
- Have students play the cards in frames so that their total is the greatest from among the rest of the players.

Example:

_____ + _____ - _____ + _____ =

- Although the above frames show three operations, they can be limited or extended to include powers of ten, square root, and so on.
- This game looks simple enough to play, yet requires reasoning ability. Students must think in terms of combining possiblities. A sample round might look like this:

The student draws these cards, one at a time, from the deck: 5,8,15,3. One might reason upon drawing the 5 that chances of choosing a larger number in the remaining tries are very good. Place the 5

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) 4-6

where it will do the least damage, and even help in the subtraction frame:

Example:

______ + ______ - __5__ + ______ =

Upon choosing the 8, the student might reason that this is a good number to use for the addition operation, and place the 8 in the first frame:

Example:

__8__ + ______ - __5__ + ______ =

__8__ + __15__ - __5__ + __3__ = 21

- The game can be varied by allowing (or not allowing) students to move a card once it is played on the set of frames.

Title:	Kentucky Derby (Roller Derby; Indy 500)
Group Size:	small groups
Materials:	chalkboard, transparency, toy horses or cars, 3" x 5" cards on which problems have been written

Procedure(s):

- A team advances its horse by correctly solving problems. A correct answer moves the horse to the next furlong marker.
- The game can be made to fit the interests of the class by changing the name to "Roller Derby" or "Indy 500." The same rules apply, except that laps are counted instead of furlongs.
- An arbitrary number of laps may be set at the discretion of the teacher.

Suggested Monitoring Procedures

Possible Resources

Money, Basic Skills in Math, Hestwood and Orf, Allyn and Bacon pp. 36-54

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the basic units of money covered in K-3; penny, nickel, dime and quarter, half-dollar, dollar. B. The student is able to add and subtract two money values using dollar and cents notation.

State Goal	1,8
District Goal	
Program Goal	2,4,5,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: How Much?
Group Size: individual, entire class
Materials: paper bills and coins (could be cut from pages 36-54 in *Money*), envelopes

Procedure(s):

- Put bills and coins in envelopes.
- Have students find amount and write on envelope.
- Have two students sit together and figure total of both envelopes. First, by counting money when put together, then by adding amounts written on front of envelopes.
- Then go to group three, four, or more. Which is the fastest method?
- Go back to groups of two and find differences. First by counting money left over after matching, and second, by doing subtraction.
- Who has the most money? How much more?

Title: Money Hangman
Group Size: pairs
Materials: five sets of cards marked with digits (0-9), spinner marked +, &, -

Procedure(s):

- Student picks four cards from shuffled set of cards and arranges them any way he/she chooses.

Suggested Monitoring Procedures

Possible Resources

Money, Basic Skills in Math
Hestwood and Orf, Allyn and Bacon
pp. 36-54

District Resources

Suggested Activities: Grade(s) 4-6	Suggested Monitoring Procedures	Possible Resources
. Students record this number inserting decimal point and dollar, then replaces cards in deck and shuffles. . Student draws another four cards and arranges them any way desired and inserts decimal points and dollar notations. . Student then spins the spinner and performs the operation. . If the student is correct--nothing is added to hangman. . First person hanged loses.		
		District Resources

Suggested Objective Placement 4-

Student Learning Objective(s) A. The student knows the basic units of money covered in K-3; penny, nickel, dime and quarter, half-dollar and dollar. B. The student is able to solve money problems by use of multiplication or division. C. The student is able to multiply or divide a given amount of money.

Related Area(s)

State Goal	1,8
District Goal	
Program Goal	3,4,5,

Suggested Activities: Grade(s) 4-

Title: Flash Card Sports

Group Size: entire class, even number divided into two teams

Materials: index cards, chalkboard or transparency

Procedure(s):

Baseball - need baseball diamond on board or transparency.

- Money problems involving multiplication or division on cards in four piles.
- The 'single' pile would consist of easy problems, the 'double' pile, average; the 'triple' pile, difficult; the 'homer' pile, word problems.
- An incorrect answer is an out; no balls or strikes. One point for each run.

Football - need football field on transparency:

- Start on 50 yard line.
- Stack of problem cards: 1 yard gain, easy; 2 yard gain, average, 5 yard gain, difficult; 10 yard gain, word problems.
- Team gets four chances to make 10 yards or must punt.
- To punt on fourth down, the team must answer the question correctly.
- All punts are 30 yards long.
- A touchdown scores 6 points.

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) ______

Title: Money Challenge
Group Size: entire class
Materials: chalkboard, worksheet of money problems

Procedure(s):

- One student challenges another to a problem on the board.
- First one finished wins and goes on to another challenge.
- Three wins retires a champ, and then champs have a playoff.
- Final champ is overall winner.

Suggested Monitoring Procedures

Teacher hints as necessary.

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Measurement: Linear

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8
The student knows:							
. the term "centimeter" refers to a metric unit of linear measurement.		1					
. the term "inch" refers to an English unit of linear measurement.		1					
. the term "meter" refers to a metric unit of linear measurement equal to 100 centimeters or 10 decimeters.		2					
. the term "foot" refers to a unit of linear measurement equal to 12 inches.		2					
. the term "yard" refers to a unit of linear measurement equal to three feet or 36 inches.		2					
. the term "half-inch" is a unit of linear measurement.		3					
. the term "quarter-inch" is a unit of linear measurement.		3					
. two quarter inches equal one half-inch.	355	3-4					
. four quarter inches equal one inch.		3-4					
. four quarter inches equal two half-inches.		3-4					
. the term "kilometer" is a metric unit of linear measurement.	361	3-4					
. the term "perimeter" refers to the linear measurement around a given space. (geometry)	357	3-4					
. the term "mile" is an English unit of linear measurement used to indicate distance.	363	3-4					
The student is able to:							
* . compare size using the following terms: longer, smaller, largest, smallest, taller, tallest, longest, shortest, same.		K-1					
* . measure an object(s) using centimeters.		1					
* . measure the length of an object(s) using inches.		1					
* . measure length using a meter stick.		2					
* . measure length using a foot ruler.		2					
* . measure length using a yardstick.		2					
* . estimate lengths.		2-3					
. measure a specific length to the nearest half-inch.	355	3-4					
. measure a specific length to the nearest quarter-inch.	355	3-4					
. measure the perimeter of a simple geometric figure.	357	3-4					
. compute distance in miles.	363	3-4					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ________________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-4

Student Learning Objective(s) A. The student knows two quarter inches equal one half-inch. B. The student knows four quarter inches equal one inch. C. The student is able to measure a specific length to the nearest half-inch. D. The student is able to measure a specific length to the nearest quarter-inch.

State Goal	1
District Goal	
Program Goal	1,2, 5,6

Related Area(s)

Suggested Activities: Grade(s) 4

Title:

Group Size: small groups, entire class

Materials: thin strips of oak tag or plastic cut to various lengths of quarter inches: i.e., 5 1/4, 1/4, 3/4, 2 1/4, 6 3/4, etc; an envelope to hold the assorted strips; a measuring rod in quarter inches on one side and half inches on the other; a measuring rod with quarter inches on one side, inches on the other, plus a rod with half inches on one side and inches on the other

Procedure(s):

- Students empty contents of envelope on floor and draw strips and guess at their length (to the nearest unit being considered). The rods are used to determine if the student is correct. If they guess it correctly, they keep the strip. If they guess incorrectly, the strip is placed back in the envelope. Players take turns. When all strips have been won, empty the envelope again, or determine a winner from the number of strips held.

Variations:

- Name the strip to so many inches and the nearest quarter inch; or so many inches and the nearest half inch, etc. The rods are to determine if the "guesses" are correct.

Suggested Monitoring Procedures

Give students a worksheet with line segments of varying lengths. They are to use their rulers to measure the length and fill in the correct length by the segment, i.e.:

.____1 1/2"____.

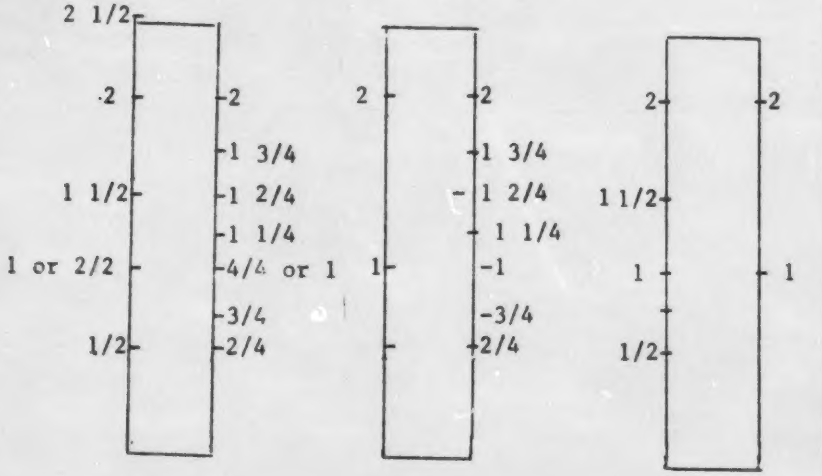
.____1 1/4"____.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______


2 1/2
.2
-2
-1 3/4
1 1/2
-1 2/4
-1 1/4
1 or 2/2
-4/4 or 1
-3/4
1/2
-2/4
2
2
1 3/4
1 2/4
1 1/4
1
-1
-3/4
2/4
2
2
1 1/2
1
1
1/2

Title: Scavenger Hunt

Group Size: entire class divided into groups

Materials: lists of measurements for items to be sought

Procedure(s):

- Students are given lists and have one class period to return with items measuring the desired lengths.

  Example:

  3¼ inches - test tube
  5½ inches - pencil, pen
  10¼ inches - math book (length)
  30½ inches - baseball bat
  6½ inches - eraser
  3¼ inches - chalk

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-4

Student Learning Objective(s) A. The student knows the term "perimeter" refers to the linear measurement around a given space. (geometry) B. The student is able to measure the perimeter of a simple geometric figure.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

Suggested Activities: Grade(s) 4

Title: Measure The Figure
Group Size: two to five
Materials: perimeter board per person, 40 laminated game sheets--use connect-a-dot figures with dots connected around the perimeter rulers (metric or Standard Eng.), markers

Procedure(s):

- The student draws a game sheet from the stack and measures the sides of the figure and computes the perimeter. (see illustration)
- The student moves the number of spaces ahead of the total units measured, i.e.,

13 cm, 7 mm = 14 spaces
13 3/4 in. = 14 spaces

- The first person to 300 units wins. (Note: Can increase points needed to win if figures are not reduced in size to playing-card size.)

Perimeter Board:
100 200 300

⑩ ⑳ ㉚ ㊵ ㊿ (60) (70) (80) (90)

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

Suggested Monitoring Procedures

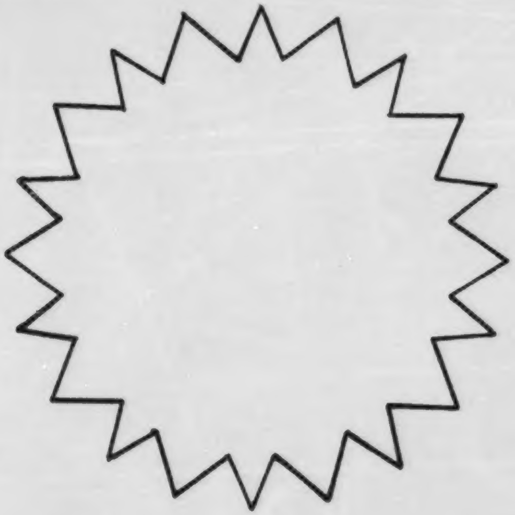
Observe students to see if they are correct in their measurements and if they understand the term perimeter.

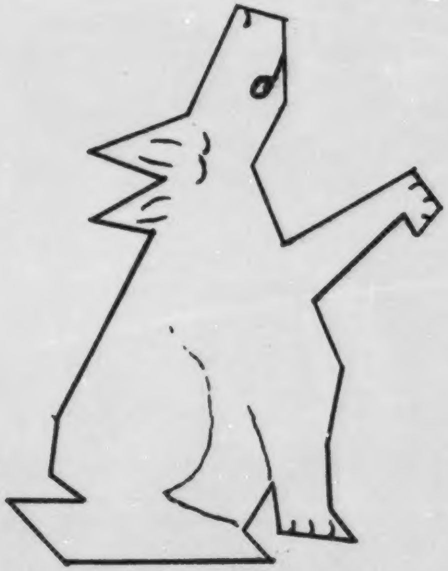
Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources





District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-4

Student Learning Objective(s) A. The student knows the term "perimeter" refers to the linear measurement around a given space. (geometry) B. The student is able to measure the perimeter of a simple geometric figure.

State Goal 1
District Goal
Program Goal 2,4,6

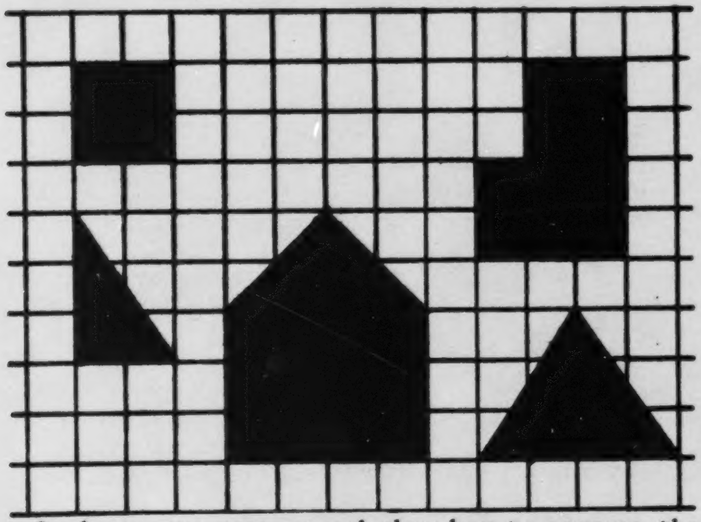
Related Area(s)

Suggested Activities: Grade(s) 4

Title:
Group Size: small group, entire class
Materials: transparencies, overhead projector, ruler

Procedure(s):

- Make a grid on transparency. Show it, using an overhead projector. Example:



- Students may come up and show how to measure the perimeter.
- Students who have difficulty with the perimeter work with cut-outs which have the measures written on each side, or blank on each side, or blank on one side. These could be laminated so they would last.

Suggested Monitoring Procedures

Observe student while measuring perimeter.

Paper-pencil test to measure perimeter.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

- Students will enjoy measuring the distances around various objects in the room; for example, a small window, the teacher's desk, their own desk or some books. This can be done in inches or centimeters.
- Students may be challenged to find the pattern in the following: Give them a triangle, square, pentagon and a hexagon. The sides of each shape are either three inches or eight centimeters in length.
- Chart to record:

No. of Sides	Length of Each Side	Distance Around
3	8 cm	24 cm
4	8 cm	
5	8 cm	

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4

Student Learning Objective(s) The student knows the term "kilometer" is a metric unit of linear measurement.

State Goal	1
District Goal	
Program Goal	2,5,6

Related Area(s)

Suggested Activities: Grade(s) 4

Title:
Group Size:
Materials:

Procedure(s):

- Before introducing kilometer, you may ask different students to use meter sticks to mark off distances of 2, 3 and 4 meters. Develop the idea of how long these distances are.
- Using their meter sticks, the student may measure off 100 meters and get some idea that 10 times that distance is quite a large unit. (It is a kilometer.)
- Give students a worksheet with two columns, one marked "meter" and the other "kilometer."
- Give students a list of items and have them put the item under the most logical measure to use.

Example:

Meters	Kilometers
distance of the playground	distance from town to town
distance of room	distance across countries
length of desk	distance to the moon
width and height of door	length of a river
length of a soccer field	distance around the earth
width of a window	

- Some hints: Kilometers are used to measure large distances. "Kilo" means 1000. One kilometer is the same length as 1000 meters.

Suggested Monitoring Procedures

Ask the student when would he/she use the kilometer to measure distance.

Pencil-paper test.

Kilo means ________________.
What would you measure with the kilometer?

Possible Resources

F1946 - Metric Measurement
F1958 - Metric Measurement
F1945 - Metric America
ESD Instructional Materials Center.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT

Suggested Objective Placement 3-4

Student Learning Objective(s) A. The student knows the term mile is an English unit of linear measurement used to indicate distance. B. The student is able to compute distance in miles.

State Goal	1
District Goal	
Program Goal	2,5,6,

Related Area(s)

Suggested Activities: Grade(s) 4

Title: How Far

Group Size: entire class

Materials: worksheet with a picture of a track on it (see picture)

Procedure(s):

. Discuss with students common measures of length such as foot, yard.

. Ask them if such units are used for long distances (such as between towns, countries, etc.) (No--not a large enough measure.)

. Discuss the term mile and its relationship to yards and feet (5,280 feet in a mile and 1760 yards in a mile.)

. Ask students to suggest some ways that the term mile is used - distance in a car, mile run in track, distance between towns and cities, city blocks, etc.

. Discuss the distance around a track and show a picture of one, or take them to an athletic track. Point out that the distance around the track is 440 yards. Compare this distance to the number of yards in a mile (440 to 1760 - ¼ - or a quarter of a mile.

. Give students a worksheet and have them compute the number of times they would have to go around the track to equal that distance. (laps), i.e., four times to equal one mile.

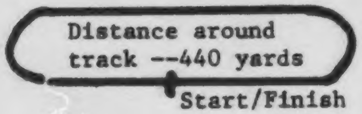
Suggested Monitoring Procedures

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______



Distance (Miles)	Number of Laps
1	4
2	
1 3/4	
1 1/2	
3 1/4	
	12
	9
	6

Title: I Walk or Run a Mile or So
Group Size: entire class
Materials: football field or playfield that is measured

Procedure(s):

- Have a designated day for "running" as part of a physical fitness program. (Students should have trained ahead of time for this activity.) Students run or walk laps around the course with one person acting as an official recorder of completed laps per student. (A time limit should be considered.)
- Upon returning to class, students could determine the miles they completed; the class completed; averages; etc.

Example: 440 yard track

Number of laps	Distance
2	½ mile
5	1¼ mile

Suggested Monitoring Procedures

Give some examples on chalkboard of laps run and have students determine the mileage the laps would measure.

Possible Resources

District adopted text.

District Resources

SUBJECT: Mathematics

SPECIFIC AREA: Measurement: Metric Linear

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
*. the abbreviation for the commonly used metric units of lengths: mm — millimeter, cm — centimeter, m — meter, km — kilometer.	367	4-6					
. the less commonly used metric units of lengths: dm — decimeter, dam — decameter, hm — hectometer.	373	4-6					
. the prefix meaning: milli--1/1000, centi--1/100, deci--1/10, deca--10, hecto--100, kilo--1000.	383	4-6					
. meter may also be spelled metre.	383	4-6					
. the term millimeter refers to 1/10 of a centimeter and 1/1000 of a meter.	367	4-6					
. the term centimeter refers to 1/100 meter and 10 millimeters.	367	4-6					
. the term decameter refers to 10 meters.	373	4-6					
. the term hectometer refers to 100 meters.	373	4-6					
The student is able to:							
. identify the unit of measurement most appropriate for a given task.	377	4-5					
*. measure a specific length to the nearest mm, cm, m.	369	4-6					
. estimate to within ±20% lengths of familiar objects in mm, cm, and m.	369	4-6					
. use the meter stick to measure to the nearest mm, cm.	369	4-6					
. convert from one linear measurement to another linear measurement within the metric system.	381	5-6					
. to distinguish which units are more precise.	389	6-8					
. round to the least precise measurement for computational purposes.		6-8					
The student values:							

720

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ________________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation for the commonly used metric units of lengths: mm — millimeter, cm — centimeter, m — meter, km — kilometer. B. The student knows the term millimeter refers to 1/10 of a centimeter and 1/1000 of a meter. C. The student knows the term centimeter refers to 1/100 meter and 10 millimeters.

Related Area(s) ____________

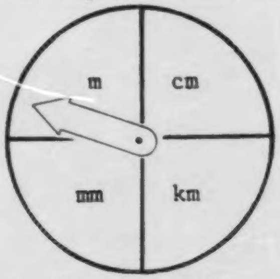
State Goal	1
District Goal	
Program Goal	2,3,8

Suggested Activities: Grade(s) 4-6

Title: Spin the Name!
Group Size: small group
Materials: circular cardboard regions (approximately 50 cm in diameter) attached spinner

Procedure(s):

. The circular region should be marked off in four sectors, each having the same area as shown in the example below. Label each of these sectors with the abbreviations km, cm, m, and mm, one abbreviation to a sector.



. Divide the group into two teams, If there is an odd number of students in the group, appoint one person as the spinner. If not, the teacher can be the spinner. After the disc's spinner is spun, each member of each team writes the measure name of the abbreviation listed in that sector. Slips of paper should be provided for each student so they do not remember the answer the next turn. Award each team one point for each correct answer.

. The winner is the team with the most points after the allotted time is up.

Note: It may be easier to start with the full names and have students write the abbreviations.

Suggested Monitoring Procedures

Give students a worksheet and have them match terms and abbreviations and values, i.e., (a through d can be used more than once)

_____km
_____cm
_____mm
_____m

a. metre
b. millimeter
c. kilometer
d. centimeter

_____1/10 of cm
_____1/100 of m
_____10 mm
_____1/1000 m

Possible Resources

District Resources

Suggested Activities: Grade(s) ____

Title: Find Other Names
Group Size: entire class
Materials: special materials optional

Procedure(s):

. Prepare individual student worksheets. Write metric measurements on the chalkboard for all to see.

Example:

1 millimeter = $\frac{1}{1000}$ (.001) meter
1 centimeter = $\frac{1}{100}$ (.01) meter
1 decimeter = $\frac{1}{10}$ (.1) meter
1 decameter = 10 meters
1 hecameter = 100 meters
1 kilometer = 1000 meters

. For a given measurement, say 10 centimeters, the students are to write as many other equivalent measurements as they can using different metric names, i.e. 10 centimeters - write 100 millimeters, .10 meters - write .00010 kilometers.

. Have students complete the following table:

mm	cm	m	km
	10		
			200
		40	
1000			
		30	
			50

. Point out to students that in the metric system, each unit is ten times greater than the next smaller unit.

Suggested Monitoring Procedures

After students have played the game for awhile, collect answer sheets to see how they are doing.

Possible Resources

Let's Play Games In Metric, Henderson, National Textbook Co.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation for the commonly used metric units of lengths: mm - millimeter, cm - centimeter, m - meter, km - kilometer. B. The student is able to measure a specific length to the nearest mm, cm, m. C. The student is able to estimate to within ±20% lengths of familiar objects in mm, cm and m. D. The student is able to use the meter stick to measure

Related Area(s) to the nearest mm, cm.

State Goal	1
District Goal	
Program Goal	1,2,6,3

Suggested Activities: Grade(s) 4-6

Title: Measure Me
Group Size: entire class
Materials: worksheet, meter sticks and centimeter-millimeter rulers

Procedure(s):

. Teacher prepares worksheet with three columns as follows:

Column 1	Column 2	Column 3
	Estimated Length	Actual Length
Window Table Desk Map etc.		

. Using their meter stick and centimeter-millimeter ruler, each student is on his/her own to measure teacher-selected items in the room, as well as some of their own items. Column 2 is for their guesses as to length, and Column 3 is for their actual measuring.

. Have the students compare their recorded answers.

Suggested Monitoring Procedures

Teacher helps students with measuring as needed.

Possible Resources

Metre Tasks - Skill Development Activities, Marilyn Sue Carey, Love Publishing Co., Denver

District Resources

Suggested Activities: Grade(s) ______

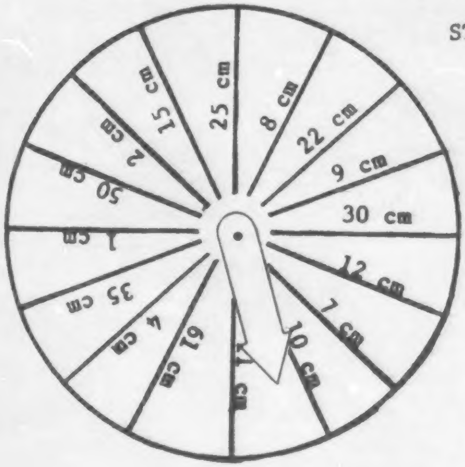
Suggested Monitoring Procedures

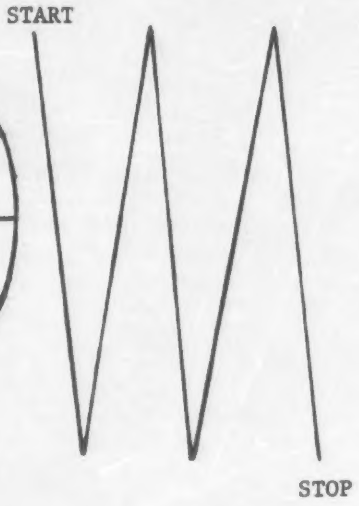
Possible Resources

Title: Spin-A-Meter
Group Size: small or large group
Materials: Spin-a-meter sheet, spinner, metric rulers, overlay overhead projector (optional)

Procedure(s):

- There will be ten spins to the game.
- Students spin the spinner and write on the spin-a-meter sheet the amount pointed to.
- After 10 spins the player adds up his/her spins and measures the length of his/her 10 spins.
- Objective is to pick spins that will enable player to be the first person whose total is OR is closest to one meter (metre).
- Winner(s) can do the spinning for the next game.





NOTE: The above should be a meter in length.

SPINS CHOSEN

1. ______
2. ______
3. ______
4. ______
5. ______
6. ______
7. ______
8. ______
9. ______
10. ______

TOTAL ______

District Resources

Suggested Objective Placement 4-6

State Goal	1
District Goal	
Program Goal	1,2,3,

Student Learning Objective(s) A. The student knows the abbreviation for the commonly used metric units of lengths: mm-millimeter, cm-centimeter, m-meter, km-kilometer. B. The student is able to measure a specific length to the nearest mm, cm, m. C. The student is able to estimate to within ±20% lengths of familiar objects in mm, cm, and m. D. The student is able to use the meter stick to measure to nearest mm. cm.

Suggested Activities: Grade(s) 4-6	Suggested Monitoring Procedures	Possible Resources

Title: Metric Golf (millimeter)

Group Size: pairs, small group

Materials: metric golf map, metric ruler marked in mm, pencil

Procedure(s):

- One student places his/her pencil on Tee #1, closes his/her eyes and draws a line toward Hole #1.
- Once stopped, he/she opens his/her eyes and estimates in millimeters the distance from the end of the line he/she has just drawn to the hole.
- The partner then measures with a millimeter ruler to determine how accurate the estimate was.
- If the estimate was within two millimeters of the actual measurement, then the player scores a Hole in One.
- If the estimate is not within two millimeters then the first player places his/her pencil at the point where he/she stopped, continues with a second line toward the hole, opens his/her eyes and makes a second estimate on the remaining distance.
- Each line drawn counts as one stroke.
- The second player then takes a turn in the same manner.
- The winner is the player with the lowest score.

Special Rules:

- If a player stops out of bounds; two-stroke penalty.
- If a player stops in a water hazard; one-stroke penalty.
- A player may cross out of bounds without penalty if he/she stops in bounds.

Variation:

- May be used as centimeters.

District Resources

score card

1 ____

2 ____

3 ____

4 ____

5 ____

6 ____

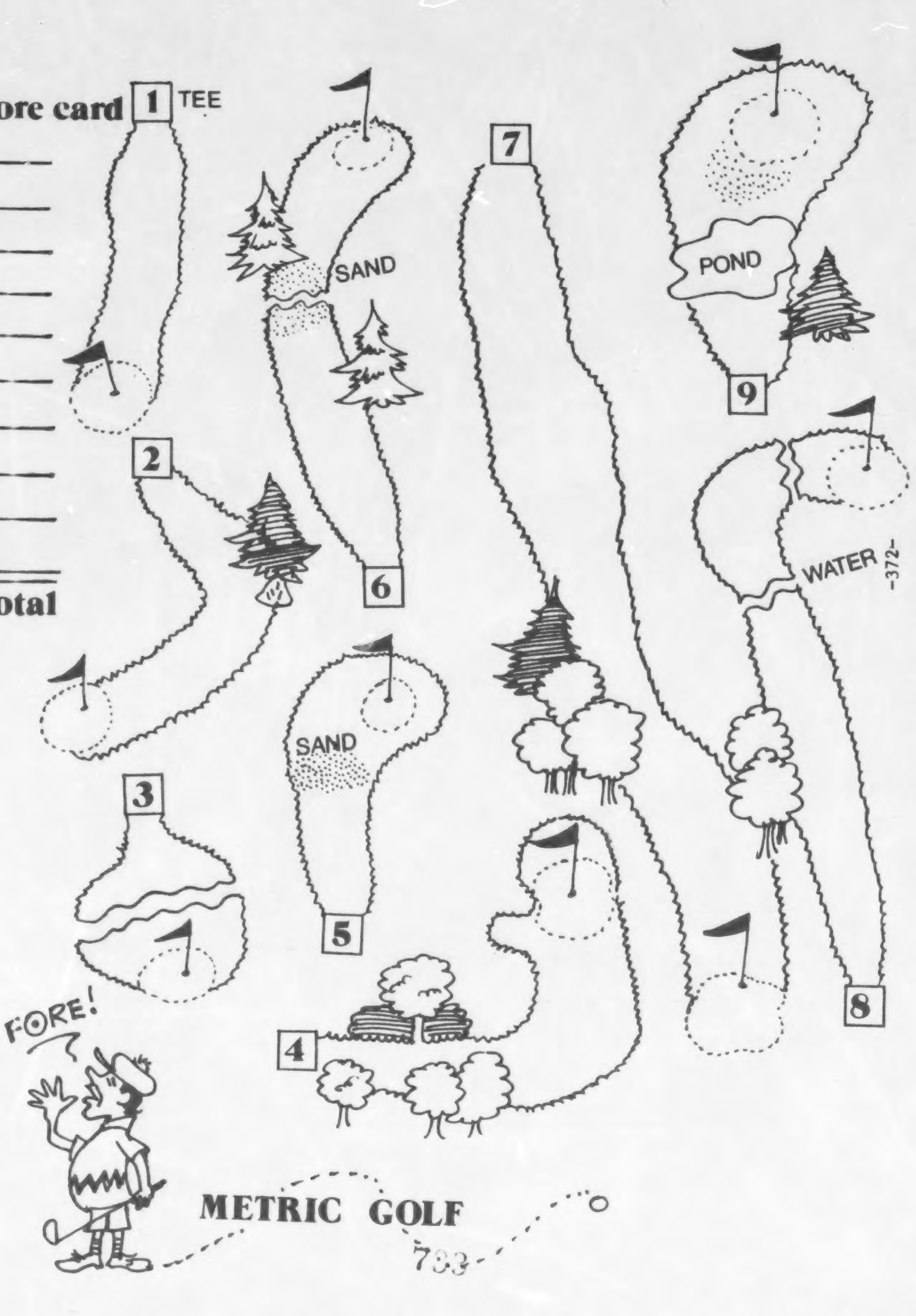
7 ____

8 ____

9 ____

═════

total


1
TEE
SAND
7
POND
9
2
6
WATER
SAND
3
5
8
4
FORE!

METRIC GOLF

SMALL SCHOOLS PROJECT

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the less commonly used metric units of lengths: dm - decimeter, dam - decameter, hm - hectometer. B. The student knows the term decameter refers to 10 meters. C. The student knows the term hectometer refers to 100 meters.

State Goal	1
District Goal	
Program Goal	1,2,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Matching Names
Group Size: two players
Materials: twenty-eight 3" x 5" cards, one 5" x 10" answer card

Procedure(s):

. Mark 14 of the 3" x 5" cards with metric measure names from List 1 below. The level of the class will determine which of the names will be used. If all are used there will be two cards each with the same name, otherwise there will be more cards with the same name. Write the abbreviations of the measure names on the other 14 cards (List 2 below), one abbreviation card for each measure name card. Copy both the measure name and the abbreviation on the answer card, pairing them correctly.

. Place all 28 cards face down at random on the table. The first player draws two cards. If they match (a name and its abbreviation), he/she places this pair in front of him/her. If they do not match, he/she replaces them face down on the table. The second player then draws two cards. If they match, he/she places them in front of him/her. If they do not match, he/she replaces them face down on the table. Play continues until all cards on the table have been used. Arguments can be settled by referring to the answer card. The player having the most matched pairs is the winner.

Suggested Monitoring Procedures

Possible Resources

Let's Play Games in Metrics, Henderson National Textbook Co.

District Resources

Suggested Activities: Grade(s) 4-6

List 1	List 2
kilometer	km
hectometer	hm
decameter	dam
meter	m
decimeter	dm
centimeter	cm
millimeter	mm

Title: Coming To Terms With Metrics
Group Size: small group, entire class
Materials: worksheet, chart

Procedure(s):

- Review the common metric units of length including meter, kilometer, centimeter and millimeter. Ask students to name some ways in which each unit could be used.
- Point out that some other measures of length are also used, but less frequently. Show students a chart of all the terms showing their relationship.

millimetre	0.001m = 1 mm
centimetre	0.01m = 1 cm
decimetre	0.1m = 1 dm
metre	1m = 1 m
decametre	10m = 1 dam
hectometre	100m = 1 hm
kilometre	1000m = 1 km

- Have students use the table to complete the following chart.

mm	cm	dm	m	dam	hm	km
1	.1	.01	.001			
10	1					
		1				
			1			
				1		
					1	
						1

Suggested Monitoring Procedures

Have students choose the greater measure in each of these problems:

a. meter or centimeter
b. hectometer or kilometer
c. millimeter or centimeter
d. decameter or meter
e. centimeter or decimeter
f. kilometer or decameter
g. decimeter or hectometer
h. decimeter or millimeter
i. millimeter or meter

Possible Resources

Metric Measurement: A Handbook for Educators
State Office of Public Instruction
Olympia, Wash. 98504, 1976

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the less commonly used metric units of lengths: dm - decimeter, dam - decameter, hm - hectometer. B. The student knows the term decameter refers to 10 meters. C. The student knows the term hectometer refers to 100 meters.

State Goal	1
District Goal	
Program Goal	1,2,6

Related Area(s) ____

Suggested Activities: Grade(s) 4

Title: Concentration
Group Size: small group
Materials: set of metric "concentration" cards

Procedure(s):

- . Make a set of metric term cards that correspond.

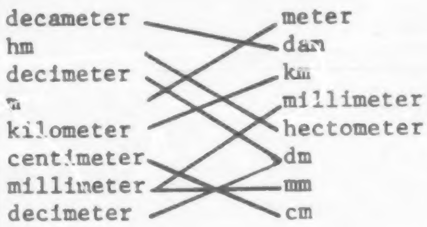
Example:

Hectometer	100 meters
dam	decameter

- . Do this for about eight terms, yielding sixteen cards.
- . Students have the set of cards placed in front of them, face down.
- . They turn over two cards at a time. If they match, the student keeps the cards. If not, the cards are turned upside down and the next player turns two over.
- . Winners can be determined by who turns and matches, correctly, the most cards.

Suggested Monitoring Procedures

Give students a matching quiz on metric units of measure (length). i.e.,



decameter	meter
hm	dam
decimeter	km
m	millimeter
kilometer	hectometer
centimeter	dm
millimeter	mm
decimeter	cm

Possible Resources

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-5

Student Learning Objective(s) The student is able to identify the unit of measurement most appropriate for a given task.

State Goal	
District Goal	
Program Goal	1,3,5,6

Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Think Metrics Card Game
Group Size: one or two students
Materials: deck of cards (Think Metrics)
construct cards by gluing sheets back to back

Procedure(s):

A. Solitaire:
- Shuffle the cards.
- Look at one side and try to recall what is on the other side.
- Give yourself one point for each one you remember
- In successive games try to beat your last score.

B. Partners:
- Show your partner the card.
- Have your partner tell you what is on the other side.
- One point per correct answer.
- Exchange back and forth.
- Game is 25.

Example(s):

prefix which means a thousand	Kilo	length of a football field	Metres
prefix which means one one hundredth	Centi		

Suggested Monitoring Procedures

Possible Resources

Think Metrics, F.O. Armbruster, Troubador Press, San Francisco, 1974.

Basic Metric Measurement Skills, Lola May and Vernon Hood, Media Research Associates, 1976

District Resources

Suggested Activities: Grade(s) ______

Title: Matching Metrics
Group Size: small groups, entire class
Materials: worksheet

Procedure(s):

- Teacher prepares worksheet that has two columns--one column with some familiar lengths; the other column with some corresponding (but out of order) ways of measuring the lengths. The worksheet should have a complete variety of measuring problems.
- Student matches two columns. They get one point for each correct answer.

Variation:

- This game could be played as teams where each member of team makes one point for the team for each correct answer.

Example:

Match the following items with the correct unit of measure: (some items will be used more than once)

_____pencil
_____paper clip
_____side of a book
_____car
_____football field
_____one town to another
_____Washington to Alaska
_____stick of chewing gum
_____basketball court
_____track
_____desk (side)

a. kilometer
b. centimeter
c. millimeter
d. meter

Suggested Monitoring Procedures

Teacher notes number of correct responses from students and provides additional activities for those with problems.

Possible Resources

Mathematics Around Us, Scott Foresman Publishing Co., Palo Alto, California, 1975

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-5

Student Learning Objective(s) The student is able to identify the unit of measurement most appropriate for a given task.

State Goal 1

District Goal

Program Goal 1,3,5,6

Related Area(s)

Suggested Activities: Grade(s) 4-5

Title: Metric Scavenger Hunt

Group Size: entire class

Materials: search task cards (one per group or student)

Procedure(s):

- Teacher lists different lengths and makes copies for the different groups or individual students,
- Class is divided into groups.
- Each group is given their task card(s).
- They must find objects and bring them back to class, or record the location of items inappropriate to bring back.
- Teacher may set a time limit of one class period.
- First group back with all objects done correctly - wins.

Example:

A.	Two meters	(teacher)
B.	One meter wide, two meters high	(door)
C.	90 meters	(length of football field)
D.	9 centimeters	(test tube)
E.	20 centimeters	(eraser)
F.	15 centimeters	(scissors)
G.	8 centimeters	(chalk, full stick)

Suggested Monitoring Procedures

Teacher checks student's objects, where appropriate, for correct measurement.

Possible Resources

Basic Metric Measurement Skills, Lola May and Vernon Hood, Media Research Associates, 1976

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-6

Student Learning Objective(s) The student is able to convert from one linear measurement to another linear measurement within the metric system.

State Goal 1
District Goal
Program Goal 2,6

Related Area(s)

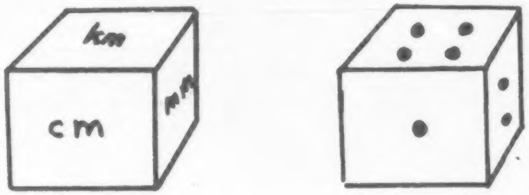
Suggested Activities: Grade(s) 5-6

Title: Shake A Name
Group Size: two to four players
Materials: pair of dice

Procedure(s):

- Cover the faces of one die with tape and write the letters km, hm, dam, dm, cm, and mm; one abbreviation on each face as shown in the example.

Example:



- Each player in turn shakes the dice and must then name another measure name for the measure indicated by the dice. For example, if the dice came up 4 km, he/she could name 4,000 meters as another name. His/her score for that round would be the number shown on the regular die, here 4. If he or she is incorrect, he/she receives no points for that round. Play continues for a specified number of rounds or until the time allotted is up.
- The winner is the player with the most points when the game is over.

Suggested Monitoring Procedures

Possible Resources

Let's Play Games In Metrics, Henderson, National Textbook Co.

Basic Metric Measurement Skills, Lola May and Vernon Hood Media Research Associates, 1976.

District Resources

Suggested Activities: Grade(s) ________ | Suggested Monitoring Procedures | Possible Resources

Title: Rename the Measure!
Group Size: entire class
Materials: no special materials needed

Procedure(s):

- Divide the class into two or more teams.
- Write a measurement on the chalkboard, such as 35 meters.
- Write the name of each team under the measurement.
- The team members now try to find other names for this measurement, such as 300 centimeters + 320 decimeters, 350 decimeters, 3,500 centimeters, and so forth. Note that the students are not allowed to use the unit of measure specified in the given example to rename the measurement.
- As each member finds a new name that has not already been used, he/she goes to the board and writes the name under his/her team name.

Title: Different Names, Same Measurement
Group Size: small group, entire class
Materials: worksheet

Procedure(s):

- Prepare individual worksheets with problems relating to converting metric measurements from one unit to another.

Example(s):

________ kilometers ________ meters
________ centimeters ________ decimeters
________ hectometers ________ kilometers
________ millimeters ________ centimeters

- The students are to make equivalent measurements by writing in the numerals before the measure name. The equivalent measurements are to be located directly across from each other. Thus for the first entries in the example, one correct set of numerals could be: 3 kilometers and 3,000 meters.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation for the commonly used metric units of lengths: mm millimeter, cm — centimeter, m — meter, km — kilometer. B. The student knows the prefix meaning: milli — 1/1000, centi — 1/100, deci — 1/10, deca — 10, hecto — 100, kilo — 1000.

State Goal	1
District Goal	
Program Goal	6 1,2,3,

Related Area(s) C. The student knows meter may also be spelled metre.

Suggested Activities: Grade(s) 4

Title: Metric Word Search
Group Size: small group, entire class
Materials: worksheets, pencils

Procedure(s):

- Teacher prepares a worksheet with all metric terms hidden within.

Example:

G	H	R	M	E	T	R	E	Z	M	N
A	B	C	D	E	F	G	H	I	J	K
L	M	N	O	P	Q	R	S	T	U	V

- Depending on group ability, words could be vertical, horizontal, diagonal or spelled backwards in any of the previous forms.
- The students are to circle as many as they can find. The most circled answer wins.

Variation:

Use abbreviations in the worksheet, as well as the words.

Suggested Monitoring Procedures

Teacher checks numbers of responses that students have with total number. Those with few responses in ample time receive some hints.

Possible Resources

Metric Tasks - Skill Development Activities, Marilyn Sue Carey, Love Publishing Co., Denver, Task 68.

District Resources

Suggested Activities: Grade(s) ______

Title: Match It

Group Size: one to four students

Materials: 1" x 3" laminated tagboard strips with an abbreviation typed on each; 9" x 12" or 12" x 18" game board of strips (laminated with the words to match the abbreviations on the 1" by 3" strips).

Example:

km	--kilometer
cm	--centimeter
m	--metre

Procedure(s):

- . The strips on game board are to be matched by student's tagboard strips.

Variation(s):

- . Competition between students by racing the clock.
- . By having several games and students race each other.
- . The same game can be used for the prefix name and its value, i.e., milli = 1/1000.

Suggested Monitoring Procedures

Give students a worksheet and have them match terms and abbreviations. i.e.,

___km	1. metre
___deca	2. kilometer
___m	3. centimeter
___centi	4. millimeter
___cm	5. 1/1000
___mm	6. 1/100
___kilo	7. 1/10
___milli	8. 10
___deci	9. 100
___deca	10. 1000

Possible Resources

"Metre and Liter are Neater"
Educators Library of Media For Staff Development, Vol. 3, 1976
ESD Catalog

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation for the commonly used metric units of lengths: mm — millimeter, cm — centimeter, m — meter, km — kilometer. B. The student knows the prefix meaning: milli — 1/1000, centi — 1/100, deci — 1/10, deca — 10, hecto — 100, kilo — 1000.

State Goal	1
District Goal	
Program Goal	1,2,3,6

Related Area(s) C. The student knows meter may also be spelled metre.

Suggested Activities: Grade(s) 4-6

Title: Display Board
Group Size: individual, small group
Materials:

Procedure(s):

. Have the students prepare individual displays or a classroom display similar to the one shown below. Emphasize, either by writing on the display, or by explanation, that all measurements represent the same length.

Example:

1	kilometer
10	hectometers
100	decameters
1,000	meters (metres)
10,000	decimeters
100,000	centimeters
1,000,000	millimeters

. If the class is familiar with decimal notation, a display similar to the one shown below can be used.

Example:

.000001	kilometer
.00001	hectometer
.0001	dekameter
.001	meter (metre)
.01	decimeter
.1	centimeter
1	millimeter

Suggested Monitoring Procedures

Possible Resources

Let's Play Games in Metrics. Henderson, National Textbook Co.

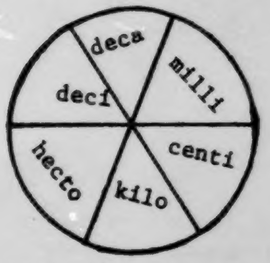
District Resources

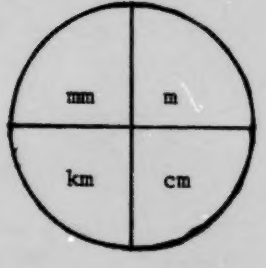
Suggested Activities: Grade(s) ______

Title: Spin the Name!
Group Size: entire class
Materials: circular cardboard regions (approximately 50 cm in diameter) attached spinners

Procedure(s):

- The circular regions should be marked off in four sectors, each having the same area as shown in the example below. Label each of these sectors with the abbreviations km, cm, mm and m, one abbreviation to a sector. On the other, mark six sectors with milli, centi, deci, deca, hecto and kilo.





- Divide the class into two teams. If there is an odd number of students in the class, appoint one person as the spinner. If not, the teacher can be the spinner. After one disc's spinner is spun, each member of each team writes the measure name of the abbreviation listed in that sector. Then spin the second spinner and follow the same procedure. Slips of paper should be provided for each student so they do not remember the answer the next turn. Award each team one point for each correct answer.
- The winner is the team with the most points after the allotted time is up.

Variation:

It might be easier at first to reverse the procedure, having the full name on the spinner, with students writing the abbreviation.

Suggested Monitoring Procedures

Possible Resources

District Resources

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Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation for the commonly used metric units of lengths: mm — millimeter, cm — centimeter, m — meter, km — kilometer. B. The student knows the prefix meaning: milli — 1/1000, centi — 1/100, deci — 1/10, deca — 10, hecto - 100, kilo — 1000.

State Goal	1
District Goal	
Program Goal	1,2,3,6

Related Area(s) C. The student knows meter may also be spelled metre.

Suggested Activities: Grade(s) 4-5

Title: Metric Bingo
Group Size: small group, entire class
Materials: blank Bingo card, markers, teacher's call slips (see back)

Procedure(s):
- Students fill in the blank squares on the Bingo card with the metric abbreviations. Some will be duplicated.
- Teacher calls out the words as the slips are drawn.
- Either blackout or regular Bingo may be played.

Example:

km	hm	dam	m	dm	cm	mm
kl	hl	dal	l	dl	cl	ml
kg	hg	dag	g	dg	cg	mg
km	hm	dam	m	dm	cm	mm
kl	hl	dal	l	dl	cl	ml
kg	hg	dag	g	dg	cg	mg
km	hm	dam	m	dm	cm	mm
kl	hl	dal	l	dl	cl	ml
kg	hg	dag	g	dg	cg	mg

Suggested Monitoring Procedures

Possible Resources

"Metre and Liter are Neater"
Educators Library of Media For Staff Development, Vol. 3 1976
ESD Catalog

District Resources

Suggested Activities: Grade(s) ______

Suggested Monitoring Procedures

Possible Resources

Variation:
Teacher calls 1/100 meter and student covers the applicable square on Bingo card.

kg	1000g (kg)	100 dag (kg)	10 hg (kg)	hg	.1 kg (hg)	10 dag (hg)
100 g (hg)	dag	10 g (dag)	.1 hg (dag)	.01 kg (dag)	g	10 dg (g)
.1 dag (g)	.001 kg (g)	dg	1/10 g (dg)	10 cg (dg)	100 mg (dg)	cg
.01 g (cg)	1/10 dg (cg)	10 mg (cg)	mg	.001 g (mg)	.01 dg (mg)	.1cg (mg)
kl	1000 l (kl)	100 dal (kl)	10 hl (kl)	hl	.1 kl (kl)	10 dal (kl)
100 l (hl)	dal	10 l (dal)	.1 hl (dal)	01 kl (dal)	l	10 dl (l)
100 cl (l)	1000 ml (l)	dl	.1 l (dl)	10 cl (dl)	cl	100 ml (dl)
.01 l (cl)	10 ml (cl)	.1 dl (cl)	ml	1/1000 l (ml)	.01 dl (ml)	.1 cl (ml)
km	1000 m (km)	100 dam (km)	10 hm (km)	hm	.1 km (hm)	10 dam (hm)
100 m (hm)	cm	.01 m (cm)	10 mm (cm)	.1 dm (cm)	mm	.001 (mm)
.1 cm (mm)	.01 dm (mm)				B	
100 cm (m)	.01 g (cg)	1000 ml (l)	1000 m (km)	1000 g (kg)	.001 km (m)	.1 cm (mm)

District Resources

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Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student is able to distinguish which units are more precise.

B. The student is able to round to the least precise measurement for computational purposes.

State Goal	1
District Goal	
Program Goal	1,2,6

Related Area(s)

Suggested Activities: Grade(s) 6

Title: How Big?
Group Size: small groups
Materials: sets of twine cut to specific metric lengths, task cards

Procedure(s):

- Teacher makes sets of twine metric linear measures and labels them.
- The teacher assembles sets in packets.
- Specify that objects are to be measured in more than one unit, and that items can be measured by combinations of measures, i.e., meters and cm.

Example:

> TASK CARD
>
> Measure how high, then how wide the following items are: door, window and the teacher's desk. Express the measure in metres and centimeters.
> If the measure were rounded off to the most precise unit what unit would it be?

Suggested Monitoring Procedures

Teacher checks completed task cards.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) _______

Title: Measure with Metrics

Group Size: small group, entire class

Materials: meter sticks, centimeter ruler, a variety of items to measure, i.e., paperclip, empty .22 caliber casing, baseball, cookie, stick of chewing gum, BB, room, baseball bat, etc.

Procedure(s):

- Give students a worksheet with a list of items to measure.
- Have students write in what measuring unit they should use to measure the item, i.e., meter stick, centimeter ruler.
- Have students estimate the length of the item, then measure it and check their estimates.

Example:

Item	measuring unit selected	estimate	measurement
baseball bat	meter stick	3/4 meter	1 meter
pencil	centimeter ruler	10 cm.	17 cm.

Suggested Monitoring Procedures

Possible Resources

Basic Metric Measurement Skills, Lola May and Vernon Hood, Media Research Associates, 1976

District Resources

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Measurement: Metric Capacity

	Page	Suggested Grade Placement	District Placement				
			4	5	6	7	8
The student knows:							
*. the abbreviation of the commonly used metric units of capacity (volume): ml - milliliter, l - liter.	393	4-6					
. the abbreviation for the less commonly used metric units of capacity: cl - centiliter, dl - deciliter, dal - decaliter, hl - hectoliter.	393	4-6					
. the prefix meanings: milli---1/1000, centi---1/100, deci---1/10 deca---10, hecto---100, kilo---1000.	393	4-6					
. liter may also be spelled litre.		4-6					
. the term milliliter refers to 1/1000 of a liter.		4-6					
The student is able to:							
. use the graduated cylinder to measure to the nearest ml and l.	403	4-6					
*. use l and ml to measure liquids.		4-6					
. estimate capacity to within ±20% of the capacity.	407	4-6					
. convert from one measurement to another measurement within the metric system.	411	5-6					
. distinguish which units are more precise.	413	6-8					
NOTE: for cubic measurement of volume see GEOMETRY.							
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ______________

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Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation of the commonly used metric units of capacity (volume): ml---milliliter, l---liter. B. The student knows the abbreviation for the less commonly used metric units of capacity: cl---centiliter, dl---deciliter, dal---decaliter, hl---hectoliter. C. The student knows the prefix meanings: milli---1/1000, centi---1/100, deci---1/10, deca---10, hecto---100, kilo---1000.

Related Area(s)

State Goal	1
District Goal	
Program Goal	2,4,6

Suggested Activities: Grade(s) 4-5

Title:
Group Size: entire class
Materials: teacher-prepared worksheet with three columns as follows:

Column 1	Column 2 Estimated Volume	Column 3 Actual Volume
cup box pin glass etc.		

Procedure(s):

- Each student should have a graduated cylinder or other metric measuring cup.
- Students are on their own to measure teacher-selected items in room as well as some of their own items. Column 2 is for their guesses as to volume. Students list actual volumes in Column 3.

773

Suggested Monitoring Procedures

Teacher helps students with measuring, as needed.

Possible Resources

Metric Tasks, Skill Development Activities, Marilyn Sue Corey, Love Publishing Co., Denver, Colo.

District Resources

774

Suggested Activities: Grade(s) _______

Title:
Group Size: entire class
Materials: prepare individual student worksheets, or write metric measurements on the chalkboard for all to see and have students copy the problems

Procedure(s):

- For a given measurement, say 31 centiliters, the students are to write as many other equivalent measurements as they can using different metric names. Thus for 31 centiliters, they could write 3.1 deciliters, 310 milliliters, .31 liters, .031 dekaliters, .0031 hectoliters, or .00031 kiloliters.

Suggested Monitoring Procedures

Possible Resources

Let's Play Games in Metrics, Henderson, National Textbook

District Resources

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation of the commonly used metric units of capacity (volume): ml---milliliter, l---liter. B. The student knows the abbreviation for the less commonly used metric units of capacity: cl---centiliter, dl---deciliter, dal---decaliter, hl---hectoliter. C. The student knows the prefix meanings: milli---1/1000, centi---1/100, deci---1/10, deca---10, hecto---100, kilo---1000.

Related Area(s)

State Goal	1
District Goal	
Program Goal	2,4,6

Suggested Activities: Grade(s) 4-6

Title: Spin Metric
Group Size: small group, entire class
Materials: grease pencil, spinner

Procedure(s):

- Make spinner by cutting a circle with a 4" radius from sturdy board. Cover the board with white paper. Then place transparent acetate (or clear contact paper) that can be written on with grease pencil on top of the paper-covered board. Make a three inch arrow from heavy paper. Insert a brass brad in the blunt end of the arrow and put the brad in the center of the circle so arrow serves as a pointer.
- Write some abbreviations, i.e., l, dl, ml, cl, dal, hl on the outer edge of the acetate with grease pencil.
- The first player spins the pointer and then names the unit of measurement on which the pointer stops.
- The second player follows the same procedure, and so the game continues. A player gets one point for each correct answer.
- The player with the most points at the end of the game - wins.

Variation:

- Vary the abbreviations on the face of the spinner by using prefix meanings, i.e., milli---1/1000, centi---1/100, deci---1/10, deca---10, hecto---100, kilo---1000.

Suggested Monitoring Procedures

Possible Resources

Metric Measurement, C.R. Trueblood Instructor Publications, Dansville, N.Y.

District Resources

Suggested Activities: Grade(s) ______

Title: Display Board
Group Size: individual, small group, entire class
Materials: optional

Procedure(s):

- Have the students prepare individual displays or a classroom display similar to the one shown below. Emphasize, either by writing on the display or by explanation, that all measurements represent the same capacity.

1	kililiter
10	hectoliters
100	decaliters
1000	liters
10,000	deciliters
100,000	centiliters
1,000,000	milliliters

- If the class is familiar with decimal notation, a display similar to the one shown below can be used.

.000001	kiloliter
.00001	hectoliter
.0001	decaliter
.001	liter
.01	deciliter
.1	centiliter
1	milliliter

Title: Find Other Names
Group Size: entire class
Materials: teacher-prepared worksheets or chalkboard

Procedure(s):

- Prepare individual student worksheets, or write metric measurements on the chalkboard for all to see, and have students copy the problems.
- For a given measurement, say 31 centiliters, the students are to write as many other equivalent measurements as they can using different metric names. Thus for 31 centiliters they could write 3.1 deciliters, 310 milliliters, .31 liters, .031 dekaliters, .0031 hectoliters, or .00031 kiloliters.

Suggested Monitoring Procedures

Possible Resources

Metric Tasks, Skill Development Activities, Marilyn Sue Corey, Love Publishing Co., Denver, Colo. Task 68

District Resources

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Suggested Objective Placement 4-6

State Goal	1
District Goal	
Program Goal	2,4,6

Student Learning Objective(s) A. The student knows the abbreviation of the commonly used metric units of capacity (volume): ml--milliliter, l--liter. B. The student knows the abbreviation for the less commonly used metric units of capacity: cl--centiliter, dl--deciliter, dal--decaliter, hl--hectoliter. C. The student knows the prefix meanings: milli--1/1000, centi--1/100, deci--1/10, deca--10, hecto--100, kilo--1000.

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Concentration
Group Size: small group
Materials: set of metric "concentration" cards

Procedure(s):

- Make a set of metric term cards that correspond.
  Example:

hectoliter   100 liters

dal   Decaliter

- Do this for about eight terms (16 cards).
- Students place the cards face down in front of them.
- Students turn over two cards at a time. If the cards match, the student keeps the cards. If not, the cards are turned upside down and the next player turns two over.

Suggested Monitoring Procedures

Teacher notes answers of students. Provide extra activities for students having difficulty.

Possible Resources

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

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Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation of the commonly used metric units of capacity (volume): ml---milliliter, l---liter. B. The student knows liter may also be spelled litre. C. The student knows the abbreviation for the less commonly used metric units of capacity: cl---centiliter, dl---deciliter, dal---decaliter, hl---hectoliter.

State Goal	1,6
District Goal	
Program Goal	2,4,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Spin-A-Liter

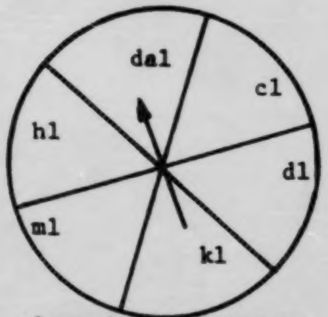
Group Size: entire class

Materials: Circular cardboard region about 50 cm in diameter and an attached spinner

Procedure(s):

- The circular region should be marked off in six sectors, each having the same area as shown in the example.
- Label each of these sectors with the abbreviations hl, dal, kl, cl, dl and ml, one abbreviation to a sector.

Example:



- Divide the class into two teams. If there is an odd number of students in class, appoint one person as the spinner. If not, the teacher can be the spinner. After the disc's spinner is spun, each member of each team writes the measure name of the abbreviation listed in that sector. Slips of paper should be provided for each student so they do not remember the answer the next turn. (Papers are thrown away after each turn.)

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) ______

- Award each team one point for each correct answer.
- The winner is the team with the most points after the allotted time is up.

Title: Match It
Group Size: small groups (one to four each)
Materials: 1" x 3" laminated tagboard strips with abbreviations typed on each. 9" x 12" or 12" by 18" game board of tagboard (laminated) with the words to match the abbreviations on the 1" x 3" strips.

Example:

kl
cl
l
ml

- kiloliter
- centiliter
- liter, litre
- milliliter

Procedure(s):

- The strips and game board are given to a student or small group.
- The strips are mixed and placed face down. A player draws a strip and matches it to the game board. If he/she fails to match, the next player attempts to match. One point is given to each correct match.

Suggested Monitoring Procedures

Possible Resources

Metric Measurement: A Handbook for Educators, State of Washington Superintendent of Public Instruction, 1976

F. "Metre and Litre are Neater". Educators Library of Media for Staff Development, Vol. 3, 1976 ESD Catalog

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation of the commonly used metric units of capacity (volume): ml---milliliter, l---liter. B. The student knows liter may also be spelled litre. C. The student knows the abbreviation for the less commonly used metric units of capacity: cl---centiliter, dl---deciliter, dal---decaliter, hl---hectoliter.

State Goal	1,6
District Goal	
Program Goal	2,4,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Metric Word Search
Group Size: small groups, entire class
Materials: worksheet

Procedure(s):

- Prepare a worksheet with metric capacity words and abbreviations hidden among the letters.
- Students are to draw a circle around the metric words or abbreviations.

Example:

a c f g l i t r e m z n o p l
h e t m i l l i l i t e r m i
z l r y d l t d a l o s y b t
k d e c a l i t e r c a b h e
c l m c e n t i l i t e r a r

Suggested Monitoring Procedures

Give students a short quiz on metric units and their abbreviations as follows:

Draw lines connecting the metric unit and its abbreviation.

l	hectoliter
ml	decaliter
hl	deciliter
dal	liter
cl	milliliter
dl	centiliter

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

791

792

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation of the commonly used metric units of capacity (volume): ml---milliliter, l---liter. B. The student is able to use the graduated cylinder to measure to the nearest ml and l.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

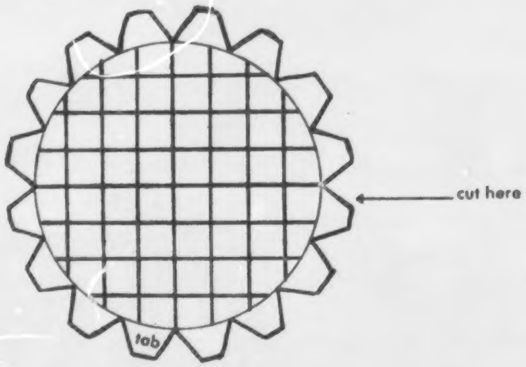
Suggested Activities: Grade(s) 4-6

Title: Make a Liter Cylinder
Group Size: entire class
Materials: worksheets of tagboard, scissors, glue, tape, sand or salt

Procedure(s):

- Make a large pattern for cylinder on tagboard worksheet.
- Instruct the students to:
  1. Cut out the parts (there should be two rectangular pieces and two circles).
  2. Paste the two rectangles together to make a longer rectangle.
  3. Roll the rectangle together to make a hollow tube.
  4. Paste the tabs on the circles and fit into the ends of the cylinder.

Example:



Diameter 8 cm

Suggested Monitoring Procedures

Possible Resources

Think Metric, F.O. Armbruster, Troubador Press

Metric Guide for Educational Materials: A Handbook for Teachers, Writers and Publishers
American National Metric Council
1625 Massachusetts Ave., N.W.
Washington, D.C. 20036, 1977

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation of the commonly used metric units of capacity (volume): ml---milliliter, l---liter. B. The student is able to use the graduated cylinder to measure to the nearest ml and l.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Displacement Derby
Group Size: small group, entire class
Materials: one of each per group: coffee can, waterproof container, graduated cylinder, sheet of graph paper

Procedure(s):

- Class is divided into small groups; each receives one of the forementioned materials.
- Cans are filled with water.
- Students place cans in waterproof container.
- In turn, they place their hand up to the wrist in the container and then carefully measure the amount of water displaced.
- They graph their findings for their group.
- The class then compares the findings.

NOTE: Other waterproof items may be compared.

Suggested Monitoring Procedures

Possible Resources

Metric Guide for Educational Materials: A Handbook for Teachers, Writers, and Publishers, American National Metric Council, 1625 Massachusetts Ave., N.W., Washington D.C. 20036, 1977

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

700

800

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation of the commonly used metric units of capacity (volume): ml---milliliter, l---liter. B. The student is able to use l and ml to measure liquids. C. The student is able to estimate capacity to within ±20% of the capacity.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Metric Recipes
Group Size: entire class
Materials: recipe sheets (below) materials to follow each recipe

Procedure(s):

. To make your own Crystal Garden, mix in a bowl:
  30 ml table salt
  30 ml water
  30 ml liquid bluing
  7 ml ammonia

. Spoon the mixture over pieces of sponge, concrete chips, or lava rock which have been placed in a pie tin. For extra beauty, drip food coloring over the garden. Crystals will begin to grow within 24 hours and continue for several days.

. To make Modeling Dough, mix in a bowl:
  250 ml salt
  250 ml flour
  125 ml water (or enough to make stiff dough)
  food coloring

. Mix the flour and salt together. Stir in the water and food coloring. Knead the dough for about five minutes. Store in a plastic bag.

Suggested Monitoring Procedures

Possible Resources

Metric Ease, Carne Barnett, Creative Publications, Palo Alto, 1975

Kit: "Metric Measurement," Educators Library of Media for Staff Development, Vol 3, 1976, ESD Catalog

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation of the commonly used metric units of capacity (volume): ml---milliliter, l---liter. B. The student is able to use l and ml to measure liquids. C. The student is able to estimate capacity to within ±20% of the capacity.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s) ____

Suggested Activities: Grade(s) 5-6

Title: Crazy Cake
Group Size: small group (3 maximum in each)
Materials: worksheet, measuring spoons, measuring cup, cooking supplies

Procedure(s):

- Select a group to make the cake following the recipe on the worksheet.

Variation:

- To save supplies, have students reduce recipe to 1/2, 1/5, 1/10 or whatever. (Easily done in metrics.)
- EQUIPMENT:
  1 measuring cup (metric)
  1 set of measuring spoons (metric)
  1 mixing spoon (wooden is best)
  1 bowl
  1 cake pan (2 if full recipe is used)

INGREDIENTS:

Full Recipe	Half Recipe	Third Recipe	
720 ccm			Flour
480 ccm			Sugar
10 ccm			Baking Soda
5 ccm			Salt
90 ccm			Cocoa
160 ml			Cooking Oil
30 ml			Vinegar
10 ml			Vanilla
480 ml			Water

Suggested Monitoring Procedures

Possible Resources

F. "Metre and Litre are Neater" Educators Library of Media for Staff Development, Vol. 3, 1976 ESD Catalog

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources

- DIRECTIONS:
  - Have students wash hands thoroughly. Grease 8-inch square or 9-inch round cake pan. (Two pans for full recipe.) Turn oven on to 350° F.
  - Measure dry ingredients, one at a time, wiping measuring cup clean with a paper towel after each time it is used. Mix together in a bowl until well blended and no streaks of brown or white remain. Lumps can be broken up by rubbing with the back of the spoon.
  - Measure oil in measuring cup. Add vinegar and vanilla. Pour into bowl with dry ingredients. Add water and stir. Stir ingredients all together until they are well mixed and there are no lumps. Pour into cake pan.
  - Carefully place the pan in the middle of the oven. Bake 30 minutes or until the cake is done.
  - Cake can be iced when it is cool. Happy Eating!

District Resources

Suggested Objective Placement 5-6

Student Learning Objective(s) The student is able to convert from one measurement to another measurement within the metric system.

State Goal	1
District Goal	
Program Goal	1,2,4,6

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Rename the Measure!
Group Size: entire class
Materials: no special materials needed

Procedure(s):

- Divide the class into two or more teams. Write a measurement on the chalkboard, such as 35 liters.
- Write the name of each team under the measurement. The team members now try to find other names for this measurement, such as 300 centiliters + 320 deciliters, 350 deciliters, 3,500 centiliters and so on.

  Note: Students are not allowed to use the unit of measure specified in the example to rename the measurement.

Title: The Same But with Different Names
Group Size: small group, entire class
Materials: prepare worksheet as in sample below

________milliliter ________liter
________centiliter ________deciliter
________hectoliter ________liter
________liter ________centiliter
________deciliter ________hectoliter
________centiliter ________milliliter

Procedure(s):

- The students are to make equivalent measurements by

Suggested Monitoring Procedures

Possible Resources

Let's Play Games in Metrics, Henderson, National Textbook Co.

District Resources

Suggested Activities: Grade(s) ______

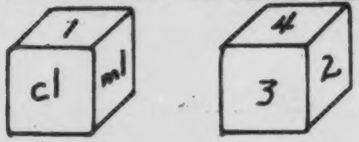
writing in the numerals before the measure name.

- The equivalent measurements are to be located directly across from each other. Thus, for the first entries, one correct set of numbers could be 3,000 milliliters and 3 liters.

Title: Shake a Name
Group Size: small groups (two to four players)
Materials: pair of dice

Procedure(s):

- Cover the faces of one die with tape and write the letters l, ml, cl, dal, hl, and dl--one abbreviation on each face as shown below:



- Each player in turn shakes the dice and must then name another measure name for the measure indicated by the dice.

Example:

If the dice came up 4l, he/she could name 4,000 milliliters as another name. Student's score for that round would be the number shown on the regular die, here 4.

- If student's answer is incorrect, he/she receives no points for that round. Play continues for a specified number of rounds or until the time allotted is up.
- The winner is the player with the most points when the game is over.

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Objective Placement 6-8

Student Learning Objective(s) The student is able to distinguish which units are more precise.

State Goal	1,6
District Goal	
Program Goal	2,4,6

Related Area(s)

Suggested Activities: Grade(s) 6

Title: Metric Measures
Group Size: small group, entire class
Materials: sets of containers

Procedure(s):

- Point out to students that in metric capacity the basic units are the liter (l) and the milliliter (ml). Metric cups are also used as an aid in measuring.
- Show students a chart for comparison as follows:

1000 milliliters	=	1 liter
250 milliliters	=	1 metric cup
4 metric cups	=	1 liter

- Have students measure liquid and dry items refering to the chart when necessary, i.e., water, sand, flour, cornmeal, juice.
- Give students a worksheet and have them express answers in the most precise metric terms.

Example(s):

1. A recipe calls for 1/5 metric cup, how many milliliters are needed? (50 ml)
2. How many metric cups are 1-1/2 liters? (6 ml)
3. Measure two metric cups of juice. How many milliliters is that? (125 ml) How many liters? (1-1/21)

Suggested Monitoring Procedures

Have students choose the most sensible measure:

1. milk carton
   2 ml 2 1
2. juice pitcher
   25 ml 1 1
3. sack of cornmeal
   380 ml 5 1
4. one metric cup of water
   250 ml 1 1
5. cottage cheese box
   125 ml 3 1

Possible Resources

District Resources

Suggested Activities: Grade(s) _______	Suggested Monitoring Procedures	Possible Resources
		District Resources

815

816

SUBJECT: **Mathematics**

SPECIFIC AREA: **Measurement: Capacity (Volume)**

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8
The student knows:							
. **the term "liter" refers to a metric unit of volume measurement.**		1-3					
. **the terms "cup," "pint," "quart" and "gallon" refer to units of capacity measurement.**		1-3					
. **two cups equal one pint.**	417	1-4					
. **four cups or two pints equal one quart.**	417	1-4					
The student is able to:							
. **measure capacity using the liter as the unit of measurement.**		1-3					
* . **measure capacity using a "cup," "pint," "quart" or "gallon" as the unit of measure.**		1-3					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ______________

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Suggested Objective Placement 1-4

Student Learning Objective(s) A. The student knows two cups equal one pint. B. The student knows four cups or two pints equal one quart.

State Goal	1
District Goal	
Program Goal	1,2,5,6

Related Area(s)

Suggested Activities: Grade(s) 4

Title: Fill 'Em Up!
Group Size: small group
Materials: old suitcase or box, beans, rice, unpopped popcorn, buttons, beads; containers of these sizes--cup, pint, quart, gallon (label each container appropriately)

Procedure(s):

- Teacher asks questions of students who respond orally, or questions may be written on a list and placed by the box or suitcase.

Example:

________cups = 1 pint
________cups = 1 quart
________pints = 1 gallon
________quarts = 1 gallon
________cups = 1 gallon

Title: Cups and Quarts
Group Size: individual, small groups
Materials: cup and quart measures, beans, rice, etc.

Procedure(s):

- Teacher instructs students to fill the cup with beans, then pour them into the quart measure. Students continue to do this, counting the number of cups used to fill the quart measure.
- Use the same procedure for above questions.

Suggested Monitoring Procedures

Teacher observes the student measuring.

Possible Resources

District adopted text.

K-3 Mathematics Curriculum

District Resources

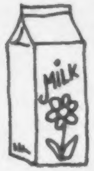
Suggested Activities: Grade(s) 4

- Note: Students need time by themselves, filling and refilling containers of many sizes, when developing concept of capacity. It is recommended that several jars or bottles and materials like beans, rice, etc., be available to students for practice in comparing and predicting capacity of containers.

Title: Cups, Pints, Quarts, Gallons
Group Size: individual or small group
Materials: paper, paste, magazines, label

Procedure(s):

- Students make a chart with 4 columns labeled:

Cup	Pint	Quart	Gallon
 Coffee Tea	PAINT THINNER Paint Thinner		 Gasoline

- List things (words or pictures) that would usually be measured with the different measures.
- Note: Before introducing this activity, ask students to check at home, in stores and neighbors' homes and with parents, etc., about liquids and container sizes. On the following day, have students make the charts, using knowledge gained out of school, along with labels or pictures of products which they were able to secure. Display charts around the room.

Suggested Monitoring Procedures

Observe and record the success of the students as they do the activities.

Possible Resources

L-00360-P LAP ESD 109 collection.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Measurement: Metric Weight

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8
The student knows:							
*. the abbreviation for the commonly used metric units of weight: mg - milligram, g - gram, kg - kilogram.	421	4-6					
. the less commonly used metric units of weight: cg - centigram, dg - decigram, dag - decagram, hg - hectogram.	421	4-6					
. the prefix meanings: milli - 1/1000, centi - 1/100, deca - 10, hecto - 100, kilo - 1000.	421	4-6					
. the term "gram" refers to weight.	431	4-6					
. the term "kilogram" refers to 1000 grams.	431	4-6					
. the term "milligram" refers to .001 grams.	431	4-6					
. the term "metric tonne" refers to 1000 kilograms.	431	6-8					
. the difference between mass and weight.		8					
The student is able to:							
. identify the unit of measurement most appropriate for weighing a given object.	437	4-5					
*. measure the weight of an object to the nearest gram.	433	4-6					
. estimate within ± 20% the weight of a familiar object.	437	4-6					
. use a balance scale to weigh objects.	437	4-6					
. convert from one unit of weight to another unit of weight within the metric system.	443	5-6					
. distinguish which units of weight are more precise.	447	6-8					

The student values:

.

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ________________

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation for the commonly used metric units of weight: mg-milligram, g-gram, kg-kilogram. B. The student knows the less commonly used metric units of weight: cg-centigram, dg-decigram, dag-decagram, hg-hectogram. C. The student knows the prefix meanings: milli-1/1000, centi-1/100, deca-10, hecto-100, kilo-1000.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

Suggested Activities: Grade(s) 4

Title: Match It
Group Size: individual, small group
Materials: 1x3" laminated tagboard strips with abbreviations typed on each 9x12" or 12x18" game board of tag (laminated, with the abbreviations on the 1x3" strip)
Example:

kg — kilogram
cg — centigram
mg — milligram

Procedure(s):

- Give the tagboard strips and game board to a student or a small group of students.
- Have them match correct abbreviation with the matching term on game board.

  Variation: Provide competition between students by having them race the clock or each other by having several games.
- The same game can be used for the prefix name and its value, i.e., milli = 1/1000.

Suggested Monitoring Procedures

Possible Resources

F: "Metre and Litre are Neater". Educators Library of Media for Staff Development, Vol. 3
1976
ESO Catalog

District Resources

Suggested Activities: Grade(s) 4

Title: Concentration
Group Size: small groups
Materials: set of metric concentration cards

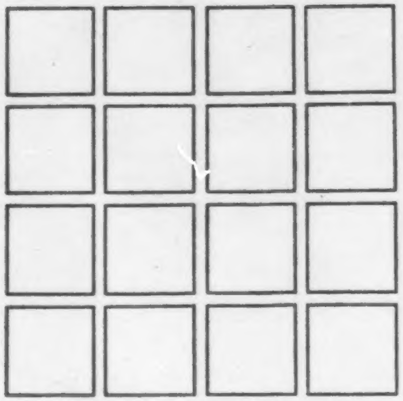
Procedure(s):

- Make set of metric term cards that correspond.
  Example: Hectogram dag 100 grams Decagram

dag	Hectogram	100 grams	Decagram

- Do this for about eight terms, yielding 16 cards.
- Students have the set of cards placed in front of them, face down.
- They turn over two cards at a time. If they match, the student keeps the cards. If not, the cards are turned upside down and the next player turns over two cards.
- Winners are determined by who turns and matches, correctly, the most cards.

CONCENTRATION



Game Board

Suggested Monitoring Procedures

Students self monitor.

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation for the commonly used metric units of weight: mg-milligram, g-gram, kg-kilogram. B. The student knows the less commonly used metric units of weight: cg-centigram, dg-decigram, dag-decagram, hg-hectogram. C. The student knows the

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s) prefix meanings: milli-1/1000, centi-1/100, deca-10, hecto-100, kilo-1000.

Suggested Activities: Grade(s) 4

Title: Dometrics
Group Size: pairs, small group
Materials: dometric cards

Procedure(s):

. With two players, deal seven cards each, face down; for three or four players, deal five cards each, face down. The remaining cards are placed face down in the center of the table. The top card from this pile is turned over as a "starter."

. To play, each player must match the "value" on either half of any card in his/her hand to either "open" end of the cards that are strung out on the table.

. If a player cannot make a match, then he/she is to select the top card from the unused deck. It then becomes the next player's turn.

. Alternate turns: when a "double" (both ends of the card the same) is played, the card may be played sideways, thus creating three "open" ends.

. The winner is the first one to play all of his/her cards.

Suggested Monitoring Procedures

Matching exercise as follows:

mg	hectogram
g	centigram
kg	milligram
cg	decagram
hg	kilogram
dag	gram

Possible Resources

Metric Guide for Educational Materials: A Handbook for Teachers, Writers and Publishers
American National Metric Council
1625 Massachusetts Avenue,
N. W. Washington, D.C. 20036
1977

District Resources

Suggested Activities: Grade(s) 4

Title: Metric Word Search
Group Size: small group, entire class
Materials: metric worksheet with all terms hidden within
Example:

```
G H R G R A M E Z M N
A B C D E F G H I J K
L M N O P Q R S T U V
```

Procedure(s):

- Depending on group ability, words could be vertical, horizontal, diagonal or spelled backwards in any of the previous forms.
- The students are to circle as many as they can find.
- The most circled answers win.

Suggested Monitoring Procedures

Teacher checks number of responses that students have with total number. Those with few responses in ample time receive some hints.

Possible Resources

Metric Tasks-Skill Development Activity, Marilyn Sue Carey, Love Publishing Co., Denver
Task Number 68

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation for the commonly used metric units of weight: mg-milligram, g-gram, kg-kilogram. B. The student knows the less commonly used metric units of weight: cg-centigram, dg-decigram, dag-decagram, hg-hectogram. C. The student knows

Related Area(s) the prefix meanings: milli-1/1000, centi-1/100, deca-10, hecto-100, kilo-1000.

State Goal	1
District Goal	
Program Goal	2, ,6

Suggested Activities: Grade(s) 5-6

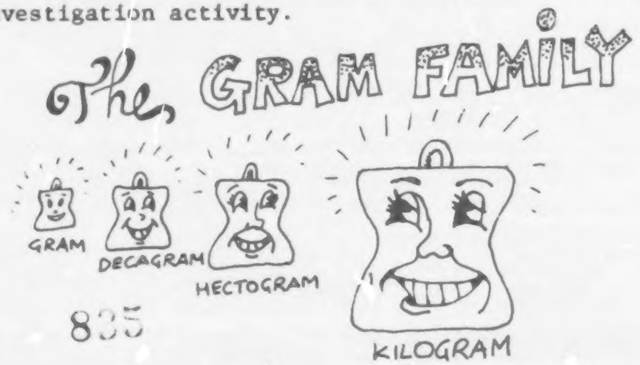
Title: The Gram Family
Group Size: small group
Materials: bulletin board, metric scale or balance with set of metric weights, charts for each student as shown:

____xl gm = 1 d g
____xl dkg = 1 hg
____xl hg = 1 kg
____xl gm = 1 dg
____xl dg = 1 cg
____xl cg = 1 mg

Procedure(s):

- Let students seek answers to the question posed on the bulletin board by weighing a set of metric weights.
- Follow the investigation by asking each student to complete a chart like the one above.
- Students may use the scale again to verify their answers.

Variation: Change the measurement unit to liter and use appropriate measuring instruments for the investigation activity.



Suggested Monitoring Procedures

Possible Resources

Metric Measurement, Trueblood
The Instructor Publishing Co.,
Danaville, N.Y.

District Resources

Suggested Activities: Grade(s) 5-6

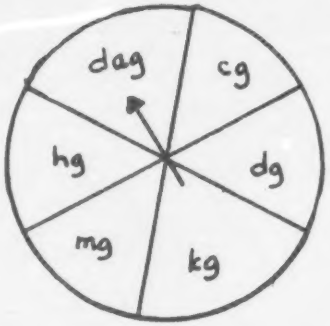
Suggested Monitoring Procedures

Possible Resources

Title: Spin the Name
Group Size: entire class
Materials: circular cardboard region (about 50 cm in diameter) with attached spinner

Procedure(s):

- The circular region should be marked off in six sectors, each having the same area (as shown in the illustration).
- Label each of these sectors with the abbreviations hg, dag, kg, dg and mg. One abbreviation to a sector.
- Divide the class into two teams. If there is an odd number of students, appoint one person as the spinner. If not, the teacher may be the spinner.
- After the disc's spinner is spun, each member of each team writes the measure name of the abbreviation listed in that sector.
- Slips of paper should be provided for each student so they do not remember the answer the next turn.
- Award each team one point for each correct answer.
- The winner is the team with the most points after allotted time is up.



District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

State Goal	1
District Goal	
Program Goal	2,4,6

Student Learning Objective(s) A. The student knows the abbreviation for the commonly used metric units of weight: mg-milligram, g-gram, kg-kilogram. B. The student knows the less commonly used metric units of weight: cg-centigram, dg-decigram, dag-decagram, hg-hectogram. C. The student knows the

Related Area(s) prefix meanings: milli-1/1000, centi-1/100, deca-10, hecto-100, kilo-1000.

Suggested Activities: Grade(s) 5-6

Suggested Monitoring Procedures

Possible Resources

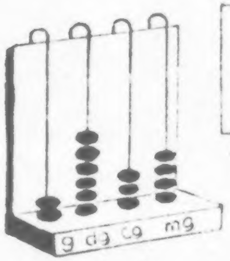
District Resources

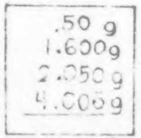
Title: Metric Abacus Computations
Group Size: entire class
Materials: multi-base abacus marked as shown, twenty problem cards as shown below

Procedure(s):

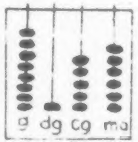
- Leader shuffles the deck of problem cards, which is then placed face up on the table.
- The first player draws a problem card and shows his/her answer on the abacus.
- The leader checks the answer and, if it is correct, shows the answer side of the card. The player gets one point.
- If the answer is incorrect, the leader does not show the answer side of the card and randomly places the card in the pile.
- Play continues with the other players until the deck is exhausted.
- The player with the most points at the end of play is the winner.

Variation: Vary the type of computation by including the other three basic operations (subtraction, multiplication and division).

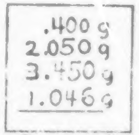




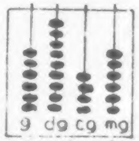
Front of Card A



Back of Card A



Front of Card B



Back of Card B

Suggested Activities: Grade(s) 5-6

Title: Find Other Names
Group Size: entire class
Materials:

Procedure(s):

- Prepare individual student worksheets, or write metric measurements on the chalkboard for all to see and have students copy the problems.
- For a given measurement, say 31 centigrams, the students are to write as many other equivalent measurements as they can, using different metric names. Thus for 31 centigrams they could write 31 decigrams, 310 milligrams, .31 grams, .031 decagrams, .0031 hectograms or .00031 kilograms.

Title: Metric Crossword Puzzle
Group Size: small group, entire class
Materials: crossword puzzle worksheet, pencil

Procedure(s):

- Each student gets a worksheet containing abbreviation and terms in the across and down clues, i.e., What is the abbreviation for milligram? or A milligram is 1/10 of what?
- The clues could be as hard as the ability level of the class.

Suggested Monitoring Procedures

Problems with the clues would indicate teacher hints necessary and extra work for students in small groups.

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the abbreviation for the commonly used metric units of weight: mg-milligram, g-gram, kg-kilogram. B. The student knows the less commonly used metric units of weight: cg-centigram, dg-decigram, dag-decagram, hg-hectogram. C. The student knows the

Related Area(s) prefix meanings: milli-1/1000, centi-1/100, deca-10, hecto-100, kilo-1000.

State Goal	1
District Goal	
Program Goal	2,4,6

Suggested Activities: Grade(s) 5-6

Title: Display Board
Group Size: individual, entire class
Materials: optional

Procedure(s):

- Have students prepare individual displays or a classroom display (see illustration). Emphasize, either by writing on the display or by explanation, that all measurements represent the same weight.

  Example:

  1 kilogram
  10 hectograms
  100 decagrams
  1,000 grams
  10,000 decigrams
  100,000 centigrams
  1,000,000 milligrams

- If the class is familiar with decimal notation, a display similar to the one shown in illustration can be used.

  Example:

  .000001 kilograms
  .00001 hectograms
  .0001 decagrams
  .001 grams
  .01 decigrams
  .1 centigrams
  1 milligrams

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) 5-6	Suggested Monitoring Procedures	Possible Resources
Title: Advanced Metric Crossword Group Size: small group, entire class Materials: crossword puzzle using metric terms that are less commonly used (i.e., dg-decigrams, dag-decagrams) for the across and down clues, the worksheet can be made as long and difficult as class ability permits	Teacher notes answers of students and those students who are having difficulty. Extra activities for those with problems.	
		District Resources

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Suggested Objective Placement 4-6

State Goal	1
District Goal	
Program Goal	2,4,6

Student Learning Objective(s) A. The student knows the abbreviation for the commonly used metric units of weight: mg-milligram, g-gram, kg-kilogram. B. The student knows the term "gram" refers to weight. C. The student knows the term "kilogram" refers to 1000 grams. D. The student knows the term "milligram" refers to .001 grams. E. The student knows the term "metric tonne" refers to 1000 kilograms.

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Metric Weight
Group Size: entire class
Materials: charts, bulletin board, worksheet, metric bathroom scales, assorted canned goods, groceries

Procedure(s):

- Display several charts showing common metric units of weight (mass) measurement.

  Example:

  milligram (mg): used in measuring small quantities
  Examples: vitamins, drugs

  grams (g): used in measuring small quantities
  Examples: soaps, cereals, canned goods

  kilogram (kg): used in measuring larger quantities
  Example: potatoes, sugar, people

  tonne (t): used in measuring larger quantities
  Example: coal, iron ore, autos

- Weigh several items such as canned goods, cereals, etc., and list the metric weights on the chalkboard.
- Elicit responses from students on the metric unit to use when weighing a sack of flour, a new car, a truck, a train engine, bar of soap, vitamin C tablets.

Suggested Monitoring Procedures

Check worksheets for understanding of the concepts.

Possible Resources

Metric Measurement: A Handbook for Educators
Office of State Superintendent of Public Instruction
Olympia, Wash. 98504
1976

District Resources

Suggested Activities: Grade(s) 4-6

- Give students a worksheet with an assortment of items and have students indicate the metric unit and the abbreviation appropriate to weight the items.

  Example:

bar of soap	gram (g)
truck	tonne (t)
Vitamin E tablet	milligram (mg)
box of cereal	gram (g)
can of corn	gram (g)
car	tonne (t)
carload of	tonne (t)
yourself	kilogram (kg)
sack of onions	kilogram (kg)

- Follow-up: Set us a center with assorted items and scale and give students a worksheet to weigh items and record the metric weight.

Title: Weigh In
Group Size: small groups
Materials: metric bathroom scale, balance scales and metric weights, assorted canned goods, dry goods, books, pennies

Procedure(s):

- Assist students in weighing several items, canned goods, cereals, etc., to assure they understand metric weights.
- Have students estimate the weight of several items such as canned goods, dry goods, then weigh them to compare to the actual weight.
- Have students estimate measures of several portions, then check to see how accurate they are.

  Example:

  1 kg of apples
  500 g of soap (powder
  250 g of dried beans
  100 g of potatoes

Suggested Monitoring Procedures

Possible Resources

"Metric Measurement", Educators Library of Media for Staff Development, Vol. 3
1976
ESD Catalog

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the term "gram" refers to weight. B. The student is able to measure the weight of an object to the nearest gram.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Weighing the Metric Way
Group Size: small group or entire class
Materials: metric bathroom scales, balance scales and metric weights, objects common to the classroom or home

Procedure(s):

- Pass around several objects such as a paper clip, eraser, basketball and give their weights in grams.
- Demonstrate how to find the weight of an object using a balance scale.
- Have students guess the weight of other objects.
- Give students a worksheet listing some common classroom and household items. Have them circle all items that would have their weight best expressed in grams. Have them use a scale to check their accuracy.

Example:

Check the most sensible unit of weight for these items:

	Milligram	Gram	Kilogram
1. paper clip			
2. nickel (5¢ coin)			
3. two potatoes			
4. dog			
5. can of beans			
6. stick of gum			

Suggested Monitoring Procedures

Teacher observation and assistance to students having difficulty with the concept.

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) 4-6

Title: Metric Weight Measure
Group Size: small group
Materials: metric bathroom scale, balance scales and metric weights

Procedure(s):

- Take an object common to the classroom such as an eraser and demonstrate how to weigh the item on scales.
- Give students a worksheet of items that would be measured in grams and have them first estimate the weight then record the actual weight.

Example:

Item	Estimated Weight in Grams	Actual Weight in Grams
softball		
paper clip		
pencil		
pen		
can of corn		
tea bag		
loaf of bread		

Suggested Monitoring Procedures

Observe use of scales and metric weights use.

Possible Resources

Metric Measurement: A Handbook for Educators
State Office of Public Instruction
Olympia, Wash. 98504
1976

District Resources

Suggested Objective Placement 6-8

Student Learning Objective(s) A. The student knows the term "gram" refers to weight. B. The student knows the term "kilogram" refers to 1000 grams. C. The student knows the term "metric tonne" refers to 1000 kilograms.

State Goal	1
District Goal	
Program Goal	2,4

Related Area(s)

Suggested Activities: Grade(s) 6

Suggested Monitoring Procedures

Possible Resources

District Resources

Title: What to Use
Group Size: entire class, small group
Materials: common objects in classroom, worksheet

Procedure(s):

- Review with students that kilogram, gram and milligram are units of mass. In common usage the units of mass are often referred to as units of weight.
- Review the relationship of milligram, gram and kilogram.

  Example:

  1 milligram (mg) = .001 gram (g)
  1000 mg = 1 g = .001 kilogram (kg)
  1000 g = 1 kg = .001 metric tonne (t)
  1000 kg = 1 t

- Review common measures used in mass such as milligrams are used for very small items such as vitamin pills; grams are also used for measuring small items such as cereals, soap; kilograms for larger items such as people; and metric tonne for any large item like a tractor.
- Enumerate a number of items common to students and have them respond as to the unit that would best be used to show the weight, i.e., student, wastebasket, car, gum, eraser.

Suggested Activities: Grade(s) 6

. Give students a worksheet and have them match each object in column one with a reasonable measure in column two.

Example:

1	1. compact car	a. 95 mg
m	2. box of candy	b. 475 mg
j	3. bunch of apples	c. 2.25 kg
a	4. eyelash	d. 56 g
d	5. tennis ball	e. 3.15 kg
g	6. textbook	f. 7 kg
c	7. canned ham	g. 1 kg
b	8. thumbtack	h. 41 kg
f	9. bowling ball	i. 1.8 kg
h	10. fourteen year old boy	j. 340 g
k	11. tiger	k. 199 kg
e	12. bag of groceries	l. 940 kg
i	13. air mail package	m. 900 g

. Worksheet as a follow-up.

Example:

Which unit would you use to describe the weight of each object? (circle your answer)

1. nickel
   gram kilogram metric tonne
2. automobile
   gram kilogram metric tonne
3. basketball
   milligram gram kilogram
4. pencil
   milligram gram kilogram
5. sewing needle
   milligram gram kilogram
6. small paper clip
   milligram gram kilogram
7. television set
   milligram gram kilogram

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student is able to identify the unit of measurement most appropriate for weighing a given object. B. The student is able to estimate within ±20% the weight of a familiar object. C. The student is able to use a balance scale to weigh objects.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title:	Prediction Activity 1
Group Size:	entire class
Materials:	even arm balance with a set of metric weights, about fifteen ball shaped objects (three sets of five, easy to arrange by visual inspection), three charts as shown below (note type of objects suggested)

Procedure(s):

- Arrange each of the three sets of objects from smallest to largest.
- Divide the class into three groups and put a set of objects before each group. (Be sure students do not pick up objects).
- Direct each group to record the sizes of the objects and predictions of their weights on the chart.
- Students then weigh each object, complete the charts, and compare the weight results with their original predictions.
- Allow students to discuss the conclusions drawn from their comparisons. The conflict between their intuitive beliefs (such as large objects are heavy and small objects are light) and what they have observed should be emphasized.
- Keep the even arm balance and the sets of objects where the students can experiment with them during free time.
- Variation: Compare a kilogram of feathers and a kilogram of rocks and discuss in terms of weight and of quantity.

Suggested Monitoring Procedures

Teacher observation and assistance in using scales.

Possible Resources

Metric Measure, Trueblood, Instructor Publications
Dansville, N.Y.

District Resources

Suggested Activities: Grade(s) 4-6

Example: (Prediction Activity 1)

Object	Size			Predicted Weight			Actual Metric Weight
	Small	Med.	Large	Light	Med.	Heavy	in g or kg
lead ball							— g or — kg
baseball							— g or — kg
styrofoam ball							— g or — kg

Title: Prediction Activity 2
Group Size: entire class
Materials: even arm balance with a set of metric weights, three bars of clay that can be reshaped readily, chart (below) for each student

Procedure(s):

- Allow students to handle all the metric weights so they get the "feel" of them.
- Then put the bars of clay on the balance, one at a time, to show students that the bars are of equal weight.
- Record the actual weights in the before column of the chart.
- Fashion the bars so that one looks like a cigar, another like a ball and the third like a pancake.
- Let students describe the shape of each object (long, round, flat) and then record their estimates of weight for each shape on their charts.
- Finally, students should weigh each reshaped bar and record its actual weight in the after column.
- Discuss conclusions students can draw from their comparisons of data on the charts. Emphasize the conflict between their intuitive belief (such as various reshapings will change the bars' weights) and what they have observed.
- Allow students to shape, reshape, and test their predictions if they wish to do so.

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

State Goal	1
District Goal	
Program Goal	2,4,6

Student Learning Objective(s) A. The student is able to identify the unit of measurement most appropriate for weighing a given object. B. The student is able to estimate within ±20% the weight of a familiar object. C. The student is able to use a balance scale to weigh objects.

Related Area(s)

Suggested Activities: Grade(s) 4-6

(Prediction Activity 2 cont'd.)

- Keep the materials in a location where the students can experiment on their own.

Example:

Object	Shape	Predicted Weight	ACTUAL WEIGHT	
			BEFORE	AFTER
Cigar Ball Pancake				

Title: Prediction Activity 3
Group Size: entire class
Materials: even arm balance with a set of metric weights, four clay bars that weigh the same and can be readily decreased and increased in mass, chart (below) for each student

Procedure(s):

- Students should be familiar with the feel of each of the metric weights.
- Weigh the bars of clay so students see that the bars are of equal weights.
- Students should record the weights of the bars in the before column of the chart.
- Take various-sized pieces of clay from each bar.
- Each student should decide if and how each bar's weight will change and record his/her prediction on his/her chart.
- Finally, allow students to weigh each bar, record its actual weight in the after column of their chart, and

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Activities: Grade(s) 4-6

(Prediction Activity 3 cont'd.)

compare the before and after weights.

- Do initial predictions conflict or agree with the actual weight? Continue by letting students add and subtract pieces of clay to test various predictions.
- Variation: Be more specific, add or subtract fractional parts (1/2, 1/3, 1/4...) of the clay bars. Students should predict and observe the corresponding weight-change relationship--if 1/2 bar is subtracted its weight is 1/2 that of the original bar and so on.

Example:

Clay Bar	Predicted Weight	ACTUAL WEIGHT	
		before	after
#1 #2 #3 #4			

Title: Guess and Test

Group Size: entire class

Materials: triple beam balance for each team, set of preweighed objects, master list of actual weights of objects, score sheet for each student

Procedure(s):

- Divide the class into three or four teams.
- Choose objects that are of nearly equal weights and place one on the left pan of each team's triple beam balance.
- Each team member picks up the object, records an estimate of its weight on his/her score sheet, and returns the object to the pan.

Suggested Monitoring Procedures

Possible Resources

District Resources

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student is able to identify the unit of measurement most appropriate for weighing a given object. B. The student is able to estimate within ±20% the weight of a familiar object. C. The student is able to use a balance scale to weigh objects.

State Goal 1
District Goal
Program Goal 2,4,6

Related Area(s)

Suggested Activities: Grade(s) 4-6

(Guess and Test cont'd.)

- After each student has made an estimate, the object should be weighed, the master list checked to see if the weight is correct, and the actual weight recorded in the proper column on each student's sheet.
- Finally, the percentage of error should be calculated using this formula:

$$\frac{\text{Actual weight--Estimate of weight}}{\text{Actual weight}} = \text{\% of error}$$

Example: $\frac{5g--4g}{5g} = 1/5 = .20 \times 100 = 20\%$

- The student with the least percentage of error scores a point for his/her team.
- Team with the most points wins.

ESTIMATE	ACTUAL WEIGHT	% of ERROR

Title: Guess Again
Group Size: entire class
Materials: balance scales, metric weights and three column worksheet (illustrated)

Procedure(s):

- Each student should have a fairly accurate balance scales.
- Students are on their own to measure teacher selected items in the room as well as some of their own items.

Suggested Monitoring Procedures

Teacher helps students with measuring as needed.

Possible Resources

District Resources

Suggested Activities: Grade(s) 4-6

- Column two is for their guesses as to their weight.
- Column three is for the actual weight. Compare the differences.

Example:

Column 1	Column 2 Estimated Weight	Column 3 Actual Weight
baseball		
pencil		
pen		
book		
eraser		
etc.		

Suggested Monitoring Procedures

Possible Resources

Metric Tasks-Skill Development Activities, Marilyn Sue Corey, Love Publishing Co., Denver

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 5-6

Student Learning Objective(s) The student is able to convert from one unit of weight to another unit of weight within the metric system.

State Goal	1
District Goal	
Program Goal	2,4

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Switch
Group Size: small group, entire class
Materials: flash cards with units of weight

Procedure(s):

- Arrange two teams as follows:

Team	Team
A	A
A	A
A	A
B	B
B	B
B	B

- Team A holds up card. His/her team member from opposite side who has equivalent weight holds up card. If they are correct, score one point; if not, allow other team to guess a weight equal to it. If they are correct, give them the point. Then repeat the process using Team B. Make sure several flash cards have the same weight but different units, i.e., 1 kilogram=1000 grams; 100 centigrams=1 gram.

Example:

Team A	Team mate
1 kilogram (kg)	1000 grams (g)
100 centigrams (cg)	1 gram (g)

Suggested Monitoring Procedures

Teacher observation noting students who have difficulty in converting from one unit of weight to another in the metric system.

Possible Resources

Metric Measurement: A Handbook for Educators
State Office of Public Instruction
Olympia, Wash. 98504
1976

District Resources

Suggested Activities: Grade(s) 5-6

Title: Concentration
Group Size: pairs
Materials: concentration board, cards

Procedure(s):

- Make up eight cards with one unit of metric weight and eight cards with equivalent units of metric weight.
- Place all cards face down on the board.
- The first player picks up one card noting the metric weight, then a second card. If they are equivalent the player receives one point and takes another turn. If not both cards are placed face down and the second player follows the same procedure.
- The winner is the student with the most cards that are equivalent.

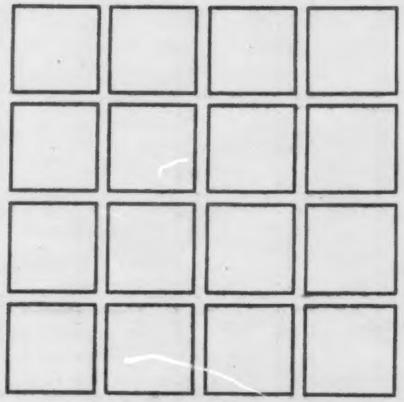
Example:

1 g	100 cg	1000 mg	1000 g	1 kg	10 dag

- NOTE: It may be helpful to use a third student as a judge.

Example of game board:

CONCENTRATION



Game Board

Suggested Monitoring Procedures

Possible Resources

District Resources

SMALL SCHOOLS PROJECT- Working Copy

Suggested Objective Placement 5-6

State Goal	1
District Goal	
Program Goal	2,4

Student Learning Objective(s) The student is able to convert from one unit of weight to another unit of weight within the metric system.

Related Area(s)

Suggested Activities: Grade(s) 5-6

Title: Are They Equal?
Group Size: small group
Materials: manila stock, worksheet

Procedure(s):

- Have students make gram weights by cutting [illegible] by 5 cm cards out of manila stock. Band the cards together in bundles to show 10 g, 50 g, and 100 g.
- Give students a worksheet and have them use bundles to assist them in telling whether the measures are equal.
- Remind students that 1 gram=1000 milligrams and 1000 grams is equal to 1 kilogram.

Example:

Tell whether the following measures are equal:

a. 3 kg, 2000 g ______ (no)
b. 5 g, 5000 mg ______ (yes)
c. 8000 g, 8 kg ______((yes)
d. 1000 mg, 1 g ______ (yes)
e. etc.

Suggested Monitoring Procedures

Check student worksheets and give additional assistance to students having difficulty with the concept.

Possible Resources

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

877

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SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 6-8

Student Learning Objective(s) The student is able to distinguish which units of weight are more precise.

State Goal	1
District Goal	
Program Goal	2,4

Related Area(s) ______

Suggested Activities: Grade(s) 6

Title: More Precise
Group Size: small group
Materials: worksheet, chalkboard

Procedure(s):

- Give students several examples of problems with units in grams, milligrams, kilograms and metric tonne.
- Point out that some units should be rounded off or converted to the next larger unit or smaller unit to be more precise.
- Give students a worksheet to practice similar problems.

Example:

1. grapes .34 kg, _____ (340 g)
2. ham _____, 2250 g (2.25 kg)
3. candy (box) .5 kg, _____ (500 g)
4. pencil 3000 mg, _____ (3 g)
5. Clydesdale horse _____, .6 t (600 kg)
6. tractor 1500 kg, _____ (1.5 t)

Title: Heads or Tails?
Group Size: small group
Materials:

Procedure(s):

- On a sheet of paper write the names of all players across the top of the page. Down the left margin write the names kilogram, hectogram, decagram, gram, decigram, centigram and milligram.
- A numeral such as 435.678 is written before the game starts and represents a measure of 435.678 grams. (Use a six-digit numeral).

Suggested Monitoring Procedures

Check worksheets and assist students having difficulty with the concept.

Possible Resources

District Resources

Suggested Activities: Grade(s) 6

- Five coins are flipped simultaneously and the first player can then choose to move the decimal point to the right as many places as he/she has "heads" showing or to the left as many places as he/she has "tails" showing.
- In no case may player form a numeral that requires the addition of zeros to place the decimal point the proper number of places.
- If a movement to the right or left cannot be accommodated with the results of his/her coin toss, player must pass.
- After the decimal point has been moved the player must correctly identify the new measure name in terms of the previous name.

  For example: If the original number represented a measure of 435.678 grams and the player chose to move the decimal three places to the right, the new number would represent a measure of 435.678 milligrams.
- If player correctly identifies the new measure he/she places a check (✓) under his/her name across from the proper measure (milligram).
- The play then moves to the next person, who begins with the measure 435.678 milligrams and flips the coins to determine the placement of the decimal point.
- Play continues in this manner until someone has completed checking all the measure names listed on the scoresheet.
- The first player to do this is the winner.
- Players will develop various strategies to move the decimal point to complete their columns and to block the completion of their opponents' column.

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Suggested Monitoring Procedures

Possible Resources

Let's Play Games in Metric, Henderson, National Textbook Co.

District Resources

882

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: **Mathematics**

SPECIFIC AREA: **Measurement: Metric Temperature**

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8
The student knows:							
. degree Celsius is used to measure temperature.	451	3-4					
*. Celsius and Centigrade are the same.	451	3-4					
. the abbreviation for Celsius is C.	451	3-4					
*. common temperature references: 0°C is freezing point of water, 37°C is normal body temperature, 100°C is boiling point of water.	451	3-4					
The student is able to:							
*. read a thermometer.	451	4-8					
*. calculate differences in degrees.	453	4-8					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ______________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-8

Student Learning Objective(s) A. The student knows degree Celsius is used to measure temperature. B. The student knows Celsius and Centigrade are the same. C. The student knows the abbreviation for Celsius is C. D. The student knows common temperature references: 0° is freezing point of water. 37° is normal body temperature, 100° is boiling point of water. E. The student is able to read a thermometer.

Related Area(s)

State Goal	1
District Goal	
Program Goal	1,2,4,6

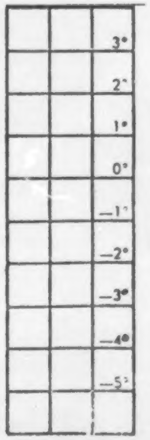
Suggested Activities: Grade(s) 4-6

Title: Celsius Temperatures
Group Size: entire class
Materials: centimeter graph paper

Procedure(s):

- Have students construct a Celsius thermometer by doing the following:
- Students draw on centimeter graph paper a number line 110 cm long. Have them make the thermometer 3 cm wide. (Add strips of graph paper if necessary to make strip long enough.)
- Students number each line starting at -5°C at the bottom, and numbering by ones to the top of the thermometer. (Position thermometer vertically when writing numbers.)
- Have students mark on thermometer the following degrees:

body temperature	37°C
boiling H_2O temperature	100°C
freezing temperature	0°C
summer day	28°C
winter day	-1°C
fish bowl temperature	___
oven temperature for baking brownies	___



Suggested Monitoring Procedures

Teacher observation.

Possible Resources

Metric Tasks, Skill Developmental Activities, Marilyn Sue Corey, Love Publishing Co., Denver, Colo. Task 36.

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 3-8

Student Learning Objective(s) A. The student knows common temperature references: 0°C is freezing point of water, 37°C is normal body temperature, 100°C is boiling point of water. B. The student is able to calculate differences in degrees.

State Goal	1
District Goal	
Program Goal	1,2,4,6

Related Area(s)

Suggested Activities: Grade(s) 4-6	Suggested Monitoring Procedures	Possible Resources

Title: Celsius Subtract

Group Size: small groups

Materials: oak tag temperature spinners (as shown below)

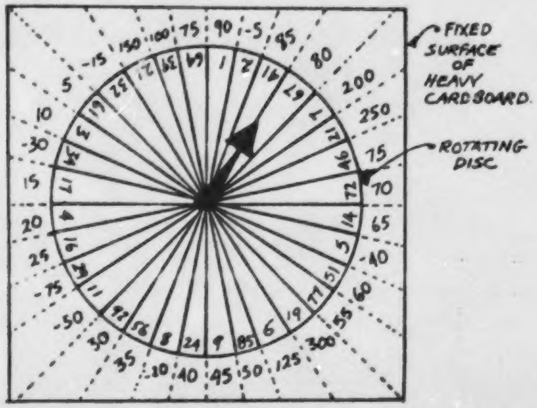
Procedure(s):

- . Construct spinner(s) as illustrated below.
- . Students in small group take turns spinning.
- . Students calculate net difference in degrees Celsius by subtracting number on rotating disc from number on fixed surface that spinner lands on. (Teacher may need to check answers.)
- . If answer is correct, student counts that answer as points.
- . If answer is incorrect, student subtracts that answer from total points.
- . Student accumulating 500 points first wins.

Variation:

- . The center disc can be rotated to introduce new subtraction facts.

Example:



FIXED SURFACE OF HEAVY CARDBOARD.
ROTATING DISC
90 -5 85 80 200 250 75 70 65 -40 60 55 300 125 50 45 40 -10 35 30 -50 -75 25 20 15 -30 10 5 -15 150 100 75
1 2 41 67 7 17 46 72 14 5 51 77 19 6 85 9 24 8 56 92 11 28 16 4 17 34 3 19 28 21 31 64

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
		District Resources

892

893

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Measurement: English

	Page	Suggested Grade Placement	District Placement 4	5	6	7	8
The student knows:							
. the basic units of the English system of linear measurement and their abbreviations: in.--inch, ft.--foot(feet), yd.--yard, mi.--mile.	457	4					
. the basic units of the English system of volume and their abbreviations: c.--cup, pt.--pint, qt.--quart, gal.--gallon.	461	4					
. the basic units of the English system of weight and their abbreviations: oz.--ounce, lb.--pound, t.--ton.		4					
. the basic unit of temperature is Fahrenheit and the common reference freezing of water is 32°, body temperature is 98° and boiling water is 212°.	463	4-6					
The student is able to:							
. maintain the skills learned in grades K-3.	457	4-8					
The student values:							

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER ________________

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4

Student Learning Objective(s) A. The student knows the basic units of the English system of linear measurement and their abbreviations: in.--inch, ft.--foot(feet), yd.--yard, mi.--mile. B. The student is able to maintain the skills learned in grades K-3.

State Goal	1
District Goal	
Program Goal	1,4

Related Area(s)

Suggested Activities: Grade(s) 4

Title: Lightweight - Heavyweight
Group Size: entire class
Materials: chart of weight measures, paper, pencil

Procedure(s):

- Give students a chart of weight measures or list them on the chalkboard.

Example:

16 ounces (oz.) = 1 pound (lb.)
2,000 pounds (lbs) = 1 ton (t)

- Have students list some common items that use these units, i.e., cars, trucks, tractors (ton): butter, coffee, dry measures (pounds): and chalk, eraser, paper, chips, candy bar (ounces).
- Give students a worksheet and have them complete the following chart:

Example:

Pounds 1	2	3	4	5	6
Ounces 16					
Tons 1	2	3	4	5	6
Pounds 2000					

- Have students choose the best answer to a series of problems using ounces, pounds and tons.

Suggested Monitoring Procedures

Possible Resources

District adopted text

District Resources

Suggested Activities: Grade(s) ______

Example(s):

- Bill's month-old baby brother weighs (9, 90, 900) pounds.
- Jim gave Sue a candy bar that weighed (4, 40, 400) ounces.
- The milk truck Mr. Johnson drove on his milk route weighed (2, 20, 200) tons.
- Mrs. Williams bought (4, 35, 350) pounds of butter.
- Jim's textbook in math weighed (1, 10, 100) pounds.
- David went grocery shopping with his mother. She purchased (50, 500, 5,000) pounds of potatoes.

Title: Measurement Comparison
Group Size: entire class
Materials: a wide variety of objects, some small, some large, found in class and some brought in (pictures rather than the actual objects will be needed in some cases), teacher-made answer sheet

Procedure(s):

- Teacher points out an object in room or picture.
- Ask students what measurement of weight (or combinations of measurements) would be best used to measure this object.
- Have students tell why that measurement was appropriate.
- Give two points for each right answer.
- Student with most points wins overall.

Example:

Ounce - oz.	Pound - lb.	Ton - t.
chalk	wastebasket	all furniture
eraser	pictures	
pencil	maps	

Suggested Monitoring Procedures

Give students a short quiz matching measures of weight, i.e., match the following:

a. 2 lbs.	____	1,000 pounds
b. 16 ozs.	____	48 ounces
c. 1 t.	____	32 ounces
d. 3 lbs.	____	320 ounces
e. 1/2 t.	____	2,000 pounds
f. 20 lbs.	____	1 pound

Possible Resources

District adopted text

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4

Student Learning Objective(s) A. The student knows the basic units of the English system of linear measurement and their abbreviations: in.-inch, ft.-foot (feet), yd.-yard, mi.-mile. B. The student is able to maintain the skills learned in grades K-3.

State Goal	1
District Goal	
Program Goal	1-4

Related Area(s) ____

Suggested Activities: Grade(s) 4

Title: Measurement Authors
Group Size: small group
Materials: sets of teacher-made cards, four cards to each book, i.e., four cards reading in. (abbreviation for inch), four cards reading 36 in. = 1 yd. and so forth, for all basic units of linear measurement.

Procedure(s):

- Students deal out seven cards and leave the remainder of the deck to draw from.
- Student on dealer's left begins play by asking any one of the other players for a card (the card must be of the same kind as the asking player already holds).
- If other player has the card, it is given to the asking player, whose turn continues as long as he/she guesses correctly. When he/she does not guess correctly, he/she draws a card from the pile, and the turn goes to the player to his/her left.
- Four like cards make a "book."
- Player with the most books wins.

Suggested Monitoring Procedures

Observe how game progresses. Give students a worksheet and have them match the basic unit of linear measurement with the correct abbreviation and definition, i.e.,

Abbreviation	Unit	Definition
____	1 yard	____
____	1 mile	____
____	1 foot	____
____	24 inches	____

Possible Resources

District adopted text

District Resources

Suggested Activities: Grade(s) ______

Title: Measure Match
Group Size: small group, entire class
Materials: teacher-made worksheet, example below

Procedure(s):

- Teacher passes out worksheet.
- Have students place the correct letter in the proper blank at the right on the worksheet.
- Teacher may set a time limit for completion of problems.
- Student with most right answers - wins.

(a) 12 inches	________ feet (abbrev.)
(b) 5280 feet	________ 1 foot
(c) 36 inches	________ mile (abbrev.)
(d) 3 feet	________ 1 yard
(e) mi.	________ 1 mile
(f) ft.	

etc., can get as hard as the group will allow.

Suggested Monitoring Procedures

Teacher observes students as they are working, giving hints when necessary.

Possible Resources

District adopted text

District Resources

Suggested Objective Placement 4

Student Learning Objective(s) A. The student knows the basic units of the English system of volume and their abbreviations: c.-cup, pt.-pint, qt.-quart, gal.-gallon. B. The student is able to maintain the skills learned in grades K-3.

State Goal	1
District Goal	
Program Goal	1,4

Related Area(s)

Suggested Activities: Grade(s) 4

__Title:__ Measurement Authors
__Group Size:__ small group
__Materials:__ set of teacher-made cards

__Procedure(s):__

- See same game for learning English system for linear measurement. Substitute capacity measurements instead.

__Title:__ Appropriate Measure
__Group Size:__ small groups, entire class
__Materials:__ no special materials needed

__Procedure(s):__

- Teacher writes several capacity measure names on the chalkboard with abbreviations.
- Have students, one at a time, call out items of capacity, and have the class or group decide which column would indicate the most suitable unit of capacity.
- List the item to be measured under the proper heading.

__Example:__

cups(c)	pints(pt)	quart(qt)	gallons(gal)
glass of water	cream	can of oil	gasoline
coffee	milk	milk	barrel
tea	juice	soft drink	aquarium

__Variation:__

- Give students a worksheet with columns and from a list of items have them place the items in appropriate columns.

Suggested Monitoring Procedures

Give students an exercise where they indicate the capacity needed to make the sentence true, i.e.,

_____cups = 1 pint
_____cups = 1 quart
_____pints = 1 gallon
_____quarts = 1 gallon
_____cups = 1 gallon

Possible Resources

District adopted text.

District Resources

Suggested Activities: Grade(s) ______

Title: Capacity Concentration
Group Size: pairs
Materials: concentration gameboard, 8 cards of one color, 8 of another color

Procedure(s):

- Eight cards of one color have capacity units written on them, i.e.,

quart	cup	pint	gallon	abbreviation for gallon	abbreviation for quart	abbreviation for cup	abbreviation for pint

- Eight cards of another color have corresponding measures, i.e.,

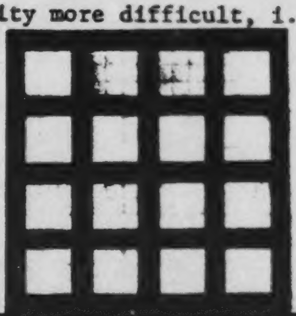
4 quarts	2 pints	8 fl. oz.	pt.	gal.	C	16 fl. oz.	qt.

- All cards are placed face down on the gameboard.
- The first player picks up one card of each color and determines if they match. If the cards match the player places them in his/her pile and proceeds with two more cards. If they do not match, he/she places the cards face down on the board.
- The second player follows the same procedure.
- The winner is the player with the most cards in his/her pile.

Variations

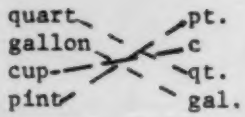
- Make the cards of capacity more difficult, i.e., 3 gals. 2 qts., etc..

Concentration Game Board



Suggested Monitoring Procedures

Give students a matching exercise on the basic units of capacity, i.e.,



Possible Resources

District adopted text.

District Resources

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 4-6

Student Learning Objective(s) A. The student knows the basic unit of temperature is Fahrenheit and the common reference freezing of water is 32°, body temperature is 98° and boiling water is 212°.

B. The student is able to maintain the skills learned in grades K-3.

State Goal	1
District Goal	
Program Goal	1,4

Related Area(s)

Suggested Activities: Grade(s) 4-6

Title: Today's Temperature
Group Size: entire class
Materials: outside and inside thermometer, large thermometer with degrees written on it located on a wall for everyone to see

Procedure(s):

- This activity could be incorporated with a unit on temperature but continued on possibly for the whole year.
- After the unit is discussed, the temperature of the body, of freezing water, and boiling water would be written in a contrasting color on the thermometer in an appropriate place.
- A student could be selected to read the outside temperature and record it on the changeable calibration of the wall thermometer for inside temperature and outside temperature (two sliding markers on the thermometer). The other students could check to see if the temperature is correct.
- The wall chart would show comparisons of outside and inside temperature to the freezing and boiling point of water and temperature of human body. The thermometer could be changed later in the day as temperature rises or falls.

Suggested Monitoring Procedures

Teacher observes temperature and checks to see if it is correct.

Students with problems will be helped.

Possible Resources

District Resources

Suggested Activities: Grade(s) ______	Suggested Monitoring Procedures	Possible Resources
Title: Fahrenheit Bingo Group Size: small group Materials: teacher-made lists of common temperatures in Fahrenheit, i.e., radiator temperature, good temperature for a football game, etc.. See Celcius Bingo Activity in Metric Temperature Section Procedure(s): . See "Celcius Bingo" in Metric Temperature Section.	Teacher watches progress.	
		District Resources